VOLUME XLI NUMBER FIVE

THE NATIONAL GEOGRAPHIC MAGAZINE

MAY, 1922

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TO carry out the purposes for which it was founded thirty-four years ago, the National Geographic Society publishes this Magazine. All receipts are invested in the Magazine itself or expended directly to promote geographic knowledge.

ARTICLES and photographs are desired. For material which the Magazine can use, generous remuneration is made. Contributions should be accompanied by an addressed return envelope and postage.

IMMEDIATELY after the terrific eruption of the world's largest crater, Mt. Katmai, in Alaska, a National Geographic Society expedition was sent to make observations of this remarkable phenomenon. Four expeditions have followed and the extraordinary scientific data resultant given to the world. In this vicinity an eighth wonder of the world was discovered and explored—"The Valley of Ten Thousand Smokes," a vast area of steaming, spouting fissures. As a result of The Society's discoveries this area has been created a National Monument by proclamation of the President of the United States.

AT an expense of over $50,000 The Society sent a notable series of expeditions into Peru to investigate the traces of the Inca race. Their discoveries form a large share of our knowledge of a civilization which was waning when Pizarro first set foot in Peru.

THE Society also had the honor of subscribing a substantial sum to the historic expedition of Admiral Peary, who discovered the North Pole.

NOT long ago The Society granted $25,000, and in addition $75,000 was given by individual members through The Society to the Federal Government when the congressional appropriation for the purchase was insufficient, and the finest of the giant sequoia trees of California were thereby saved for the American people and incorporated into a National Park.

THE Society is conducting extensive explorations and excavations in northwestern New Mexico, which was one of the most densely populated areas in North America before Columbus came, a region where prehistoric peoples lived in vast communal dwellings whose ruins are ranked second to none of ancient times in point of architecture, and whose customs, ceremonies and name have been engulfed in an oblivion more complete than any other people who left traces comparable to theirs.

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"Will you please tell me the exact time?"

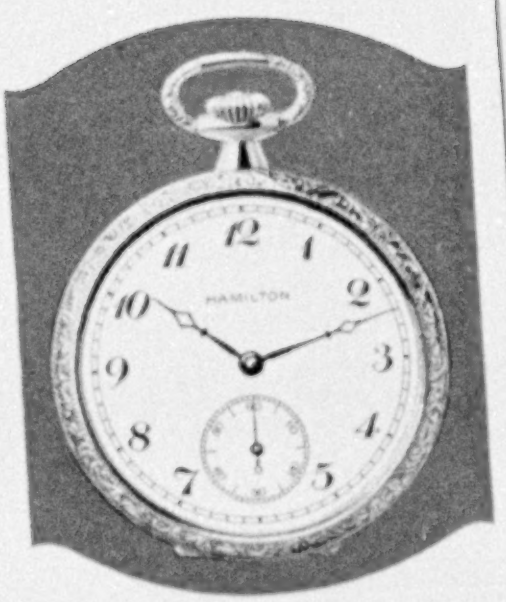
RAILROAD conductors are constantly being asked what time it is. They are known to carry accurate watches. In this picture, J. E. Hopkinson, forty years with the Boston and Maine, is obliging the passenger with the correct time. In the twenty-five years that he has carried a Hamilton Watch he has done this thousands of times. It is part of his duty to carry a watch that tells time exactly—his own courtesy that impels him to give a passenger the time.

Railroad men have accurate time invariably and carry Hamilton Watches, as a rule.

There are many good reasons why a railroad conductor in particular carries an accurate watch, but the intensity of modern business is such that every man has reason enough for owning a watch of railroad accuracy—a Hamilton Watch. And, in addition to the utility, there is a certain pride in the possession of an accurate and beautiful timepiece.

You can find in the Hamilton booklet, "The Timekeeper," the model and size that pleases you most. Write for a copy. It tells how to care for a fine watch. It shows ladies' beautiful wrist watches and thin models for men. All of them make worth-while and appreciated gifts.

Hamilton Watches range in price from $40 to $200; movements alone, $22 (in Canada, $25) and up.



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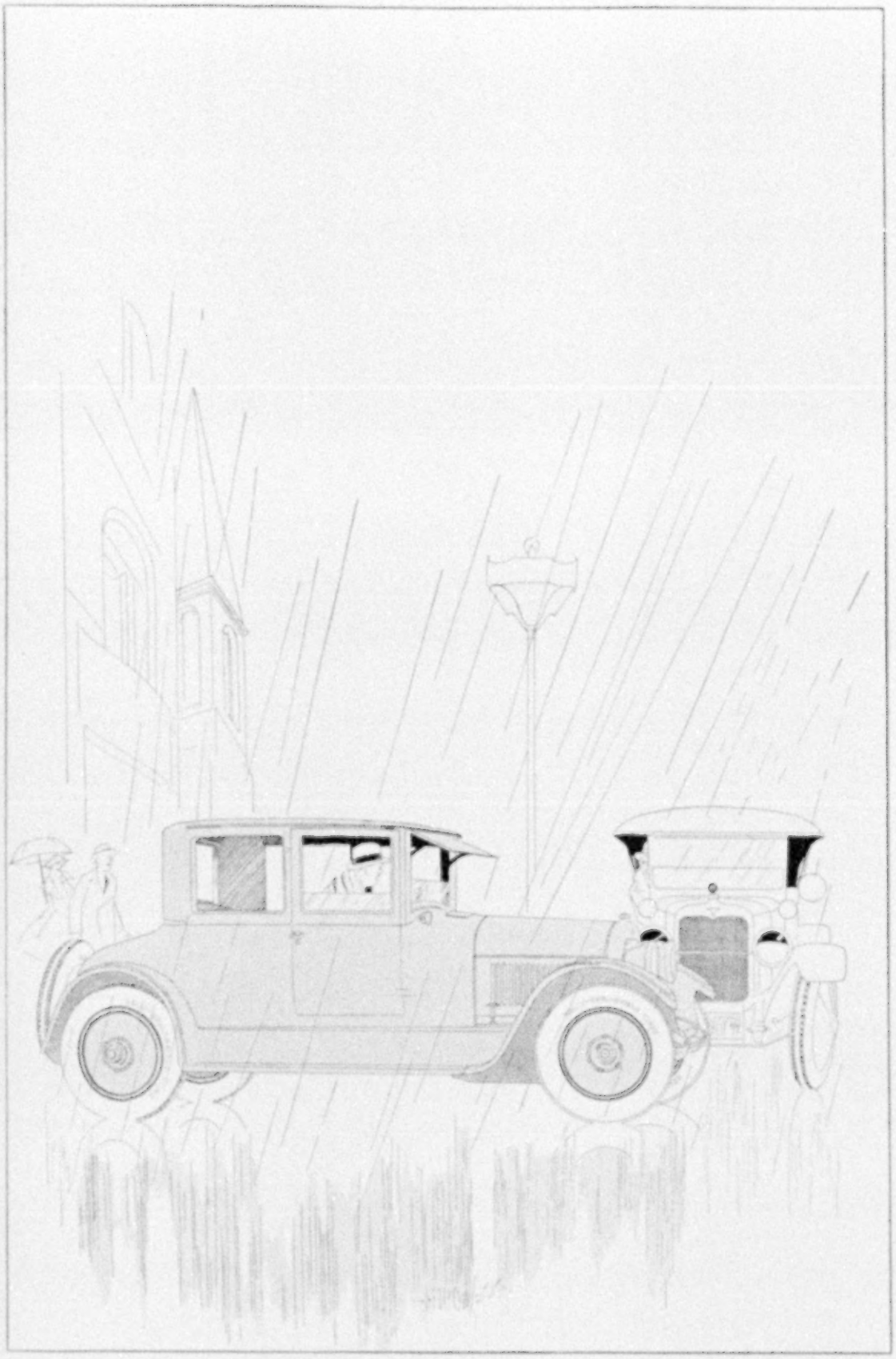

"Well?"

"It wouldn't have been 'well' if we hadn't both been driving on Kelly-Springfield Cords!"

NOT only will the new Kelly Kant-Slip Cord tire help the driver to keep his car under control on slippery streets, but it will give him the long, uninterrupted mileage which Kelly users have come to expect as a matter of course. Best of all, you can now buy Kellys for no more than you would have to pay for ordinary tires.

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Its smart style and beauty, its luxurious comfort, its assurance of long-life and maintained efficiency, its plentiful power and its appealing economy have been quickly recognized both by those who can afford far more expensive cars, and by that larger group of people who have until now considered a car as fine as the Chandler unattainable.

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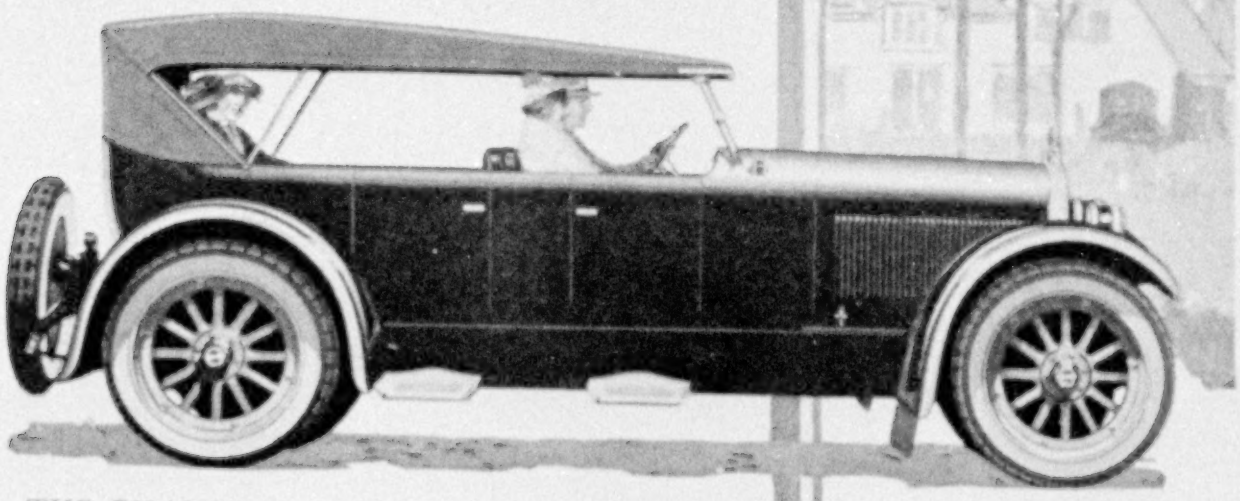

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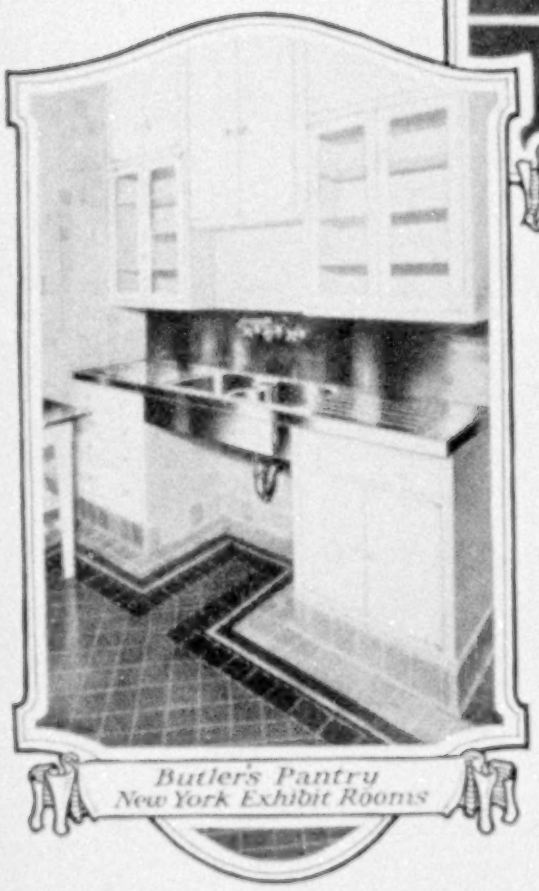

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THE Crane products shown in the accompanying photographs make possible a new standard of kitchen efficiency.

This fact is reflected in the advanced designing, as well as the thorough quality, of all kitchen and pantry sanitation equipment made by Crane Co. It is complete, convenient, handsome, durable—and so designed that its immaculate cleanliness is easily retained.

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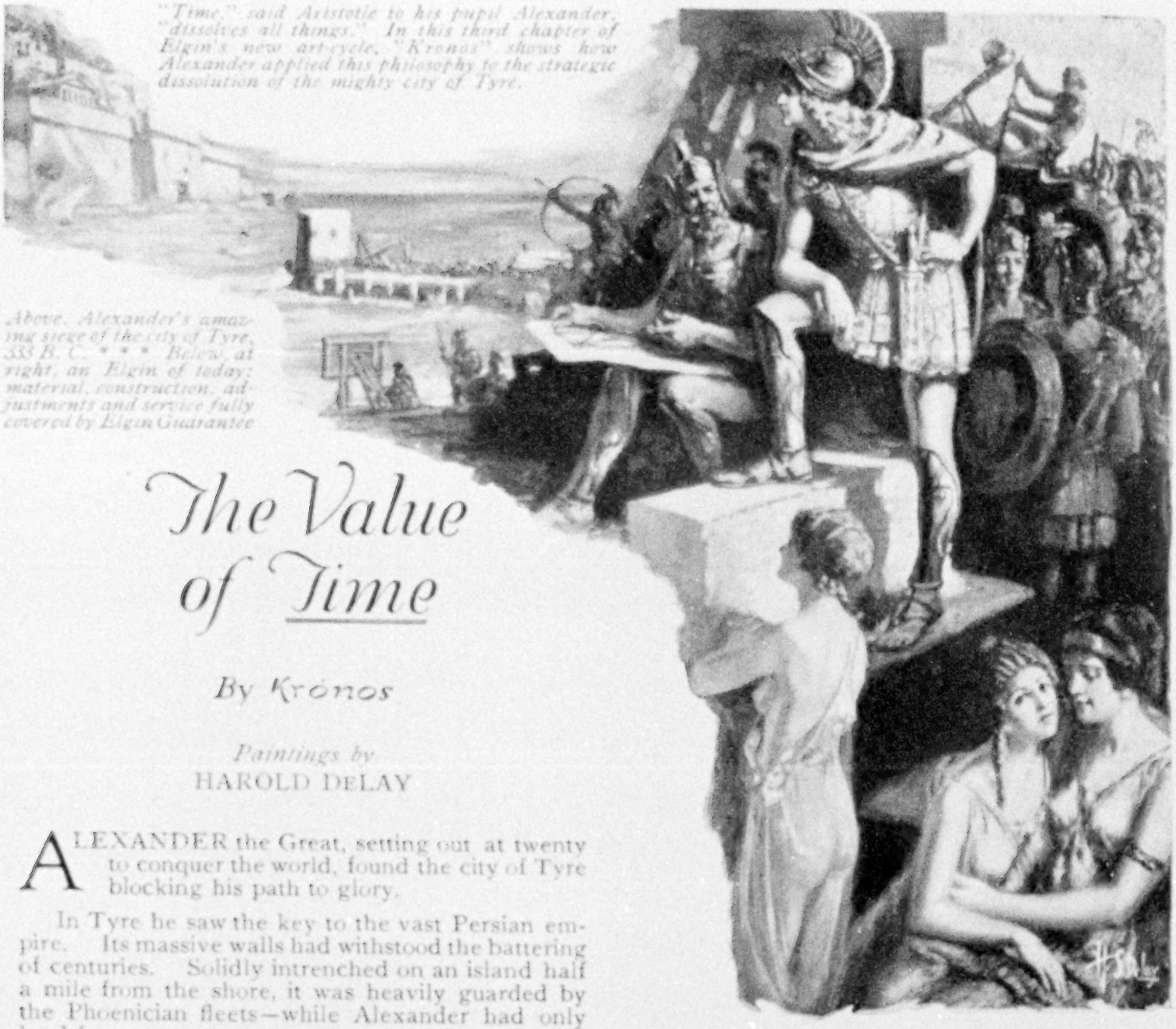
"Time," said Aristotle to his pupil Alexander, "dissolves all things." In this third chapter of Elgin's new art-cycle, "Kronos" shows how Alexander applied this philosophy to the strategic dissolution of the mighty city of Tyre.



*Above, Alexander's amazing siege of the city of Tyre, 333 B. C. * * * Below, at right, an Elgin of today; material, construction, adjustments and service fully covered by Elgin Guarantee*

The Value of Time

By Krónos

Paintings by
HAROLD DELAY

ALEXANDER the Great, setting out at twenty to conquer the world, found the city of Tyre blocking his path to glory.

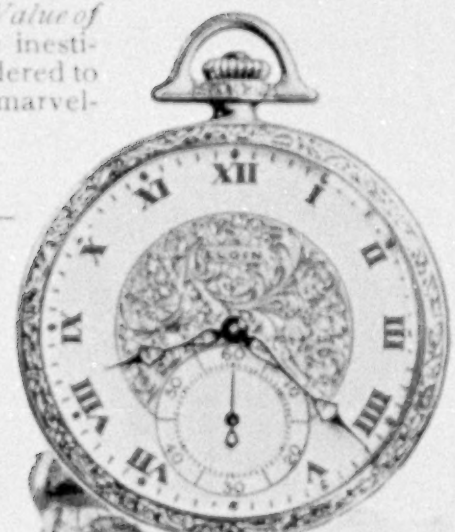
In Tyre he saw the key to the vast Persian empire. Its massive walls had withstood the battering of centuries. Solidly intrenched on an island half a mile from the shore, it was heavily guarded by the Phoenician fleets—while Alexander had only land forces.

Calling together his engineers, the youth settled down to such a siege as never was on land or sea. Under an incessant bombardment from the island, he calmly proceeded to build a great pier straight across the ocean's floor—a pier that stands to this day.

Tradition says that when his generals murmured at the delay, Alexander answered, "I *must* wait—for *I am in a hurry!*" Seven months of incredible toil bridged the gulf and made him master of the seas. Hammering his way into Tyre, he opened an easy gateway to the empires of the East. His campaign of the next few years proved that his seven months had been well invested. Alexander, like Confucius before him, knew how to take Time to *save* Time.

The boy of twenty taught the world a lesson that will be remembered to the end of Time. Before his birth, Antiphon declared that the sacrifice of Time was the most costly of all sacrifices—after his death, Theophrastus called Time "*the most valuable thing a man can spend.*"

Step by step, the world draws nearer to a practical recognition of *the Value of Time*—and of the inestimable service rendered to mankind by those marvelous timekeepers which stand guard over the priceless moments of today—



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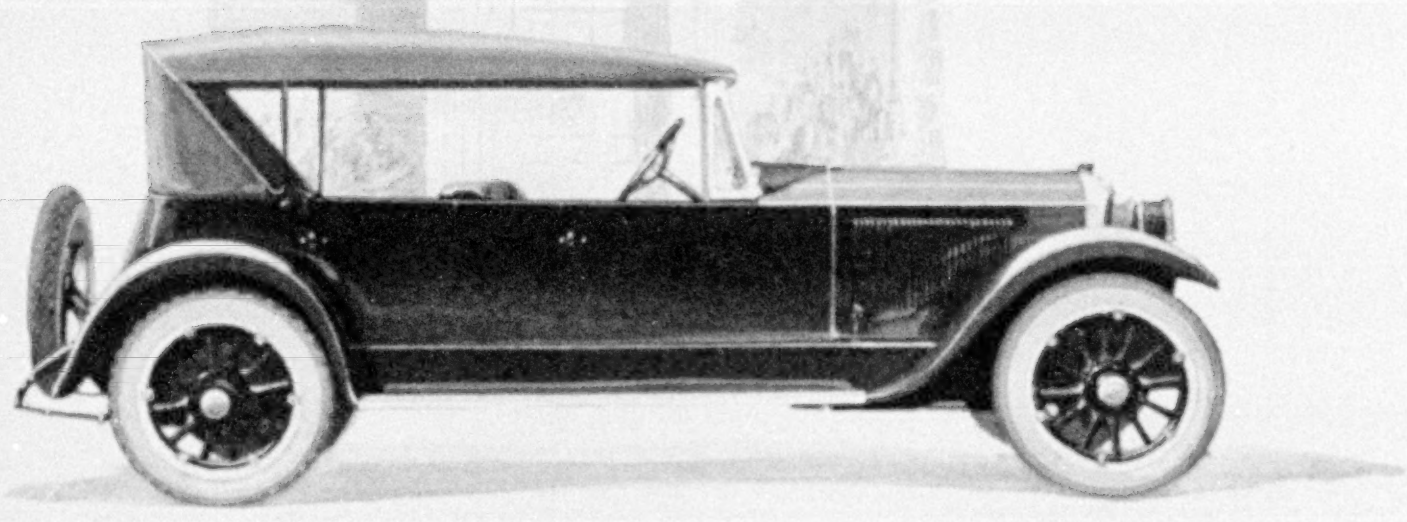

Master of the Highway

Under the hood of the Paige 6-66 is a mighty 70-horse-power engine that performs its work with the ease and smoothness of a giant turbine. This vast reserve power means not only great performing ability but long life and uninterrupted service.

Remember, that the Paige 6-66, Daytona model, holds every world's stock chassis speedway record from 5 to 100 miles. Here is proof not only of superb performance but heroic strength and stamina.

You should ride in the Paige to learn the zest of ample power and perfectly balanced chassis construction. Then you will at once notice the benefits of 131 inches of wheel base and 61 inch rear springs.

And if you should desire to own one—as you undoubtedly will—there is a pleasant surprise in store. For the Master of the Highway is now yours for $2195.

The New 6-66 Prices

6-66 Lakewood 7-Passenger Touring	$2195
6-66 Larchmont II, Sport Type	2245
6-66 Daytona, 3-Passenger Roadster	2495
6-66 Sedan, 7-Passenger	3155
6-66 Limousine, 7-Passenger	3350
6-66 Coupe, 5-Passenger	3100

All Prices F. O. B. Factory, Tax Extra Cord Tires Standard Equipment on all Models

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Firestone Cord values have given users a new high standard of mileage and service. For 1922 Firestone Cords have been selected by sixty-seven of the foremost American car makers as standard equipment. They lead in popularity too among taxicab and motor transport companies who buy on the strictest mileage basis.

30x3½, $17.50
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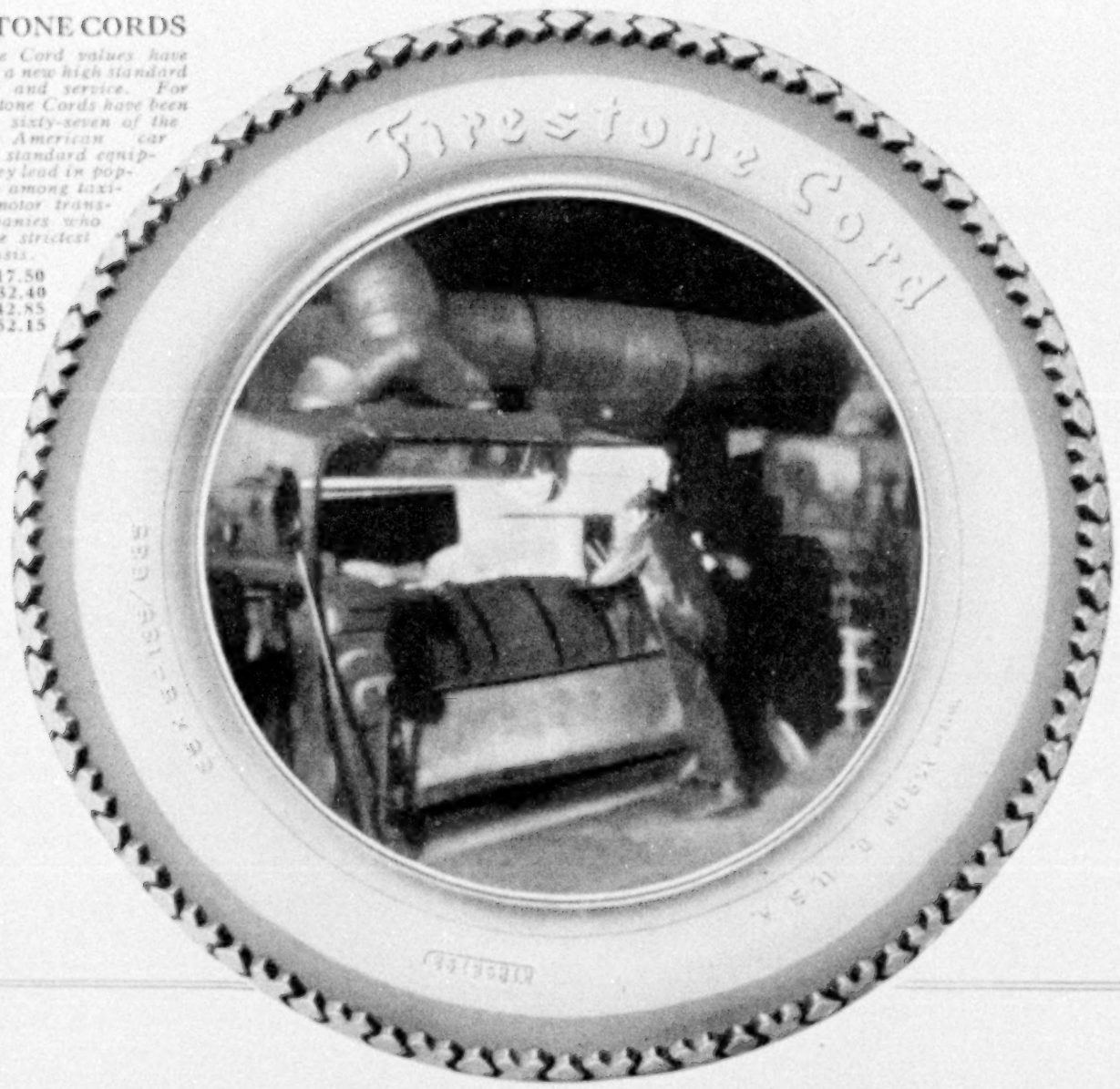


The Goal of Uniform Mileage

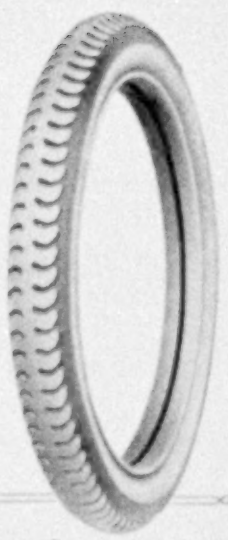
FIRESTONE mileage is attracting unusual attention, not merely because it has bettered former records, but because it is being delivered uniformly in tire after tire.

Letters from users show not one or two Firestones giving exceptional service but full sets maintaining a high average.

The reputation for the dependability of the product is zealously guarded in the Firestone organization. It requires more than efficient machines and skilled hands. It results chiefly from unceasing vigilance on the part of the worker, together with painstaking supervision of every minute detail of manufacture.

The Firestone tire-builder works with the finest equipment devised. Pride in his workmanship goes naturally with pride in the organization of which he is an actual shareholder. He recognizes his responsibility for giving Most Miles per Dollar in every tire on which the name Firestone appears.

The goal of uniformly big mileage is constantly kept in mind. This, in no small degree, accounts for the unfailing high average of Firestone performance. It is a fact worth remembering in seeking dependable tires for your car.



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30x3½ extra size non-skid, the best known tire in the light car class. Higher in quality than ever and now being produced on a scale that permits its being sold at the lowest price on record. The same unusual value in 30x3 size at $9.85.

Most Miles per Dollar

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Oldfield "999"—guaranteed—a full size 30x3½ anti-skid tire. Built with four-ply long staple fabric. In 30x3 size at $8.99. Prices that cannot be equalled for a reputable, well-known tire of trustworthy quality. Sold by Firestone dealers.

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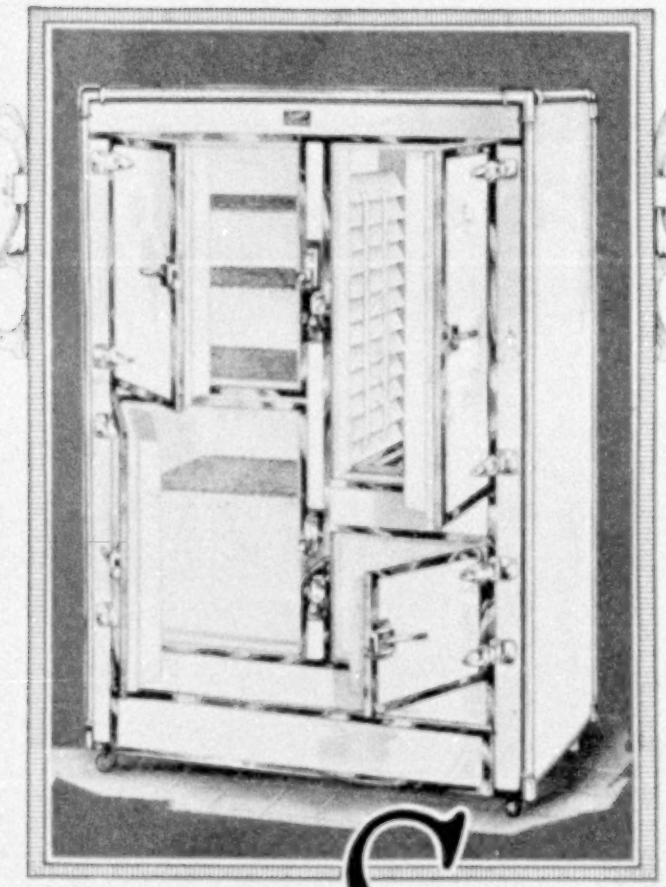

The Seeger One-Piece Porcelain Interior

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THE ORIGINAL SIPHON REFRIGERATOR

Seeger
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The function of a refrigerator is to conserve food—as economically, as hygienically, and for as long a time as possible.

Seeger Original Siphon Refrigerators have for many years and in various capacities always filled these requirements to the utmost degree. Each successive year has witnessed added improvements, until today the Seeger stands for the ultimate in refrigeration value and efficiency.

The design shown above is our 1922 All-Porcelain model, embodying our new One-Piece Porcelain Interior and the Nickel-Trimmed Exterior of the same high-grade material.

Its dignity of finish and its positive hygienic qualities recommend it everywhere.

Upon written request, we will gladly furnish a list of Railways, Hospitals, Hotels, Apartments, and U. S. Government Institutions—including the Army, Navy, Aviation, Public Health and Shipping Boards—equipped with Seeger Refrigeration.

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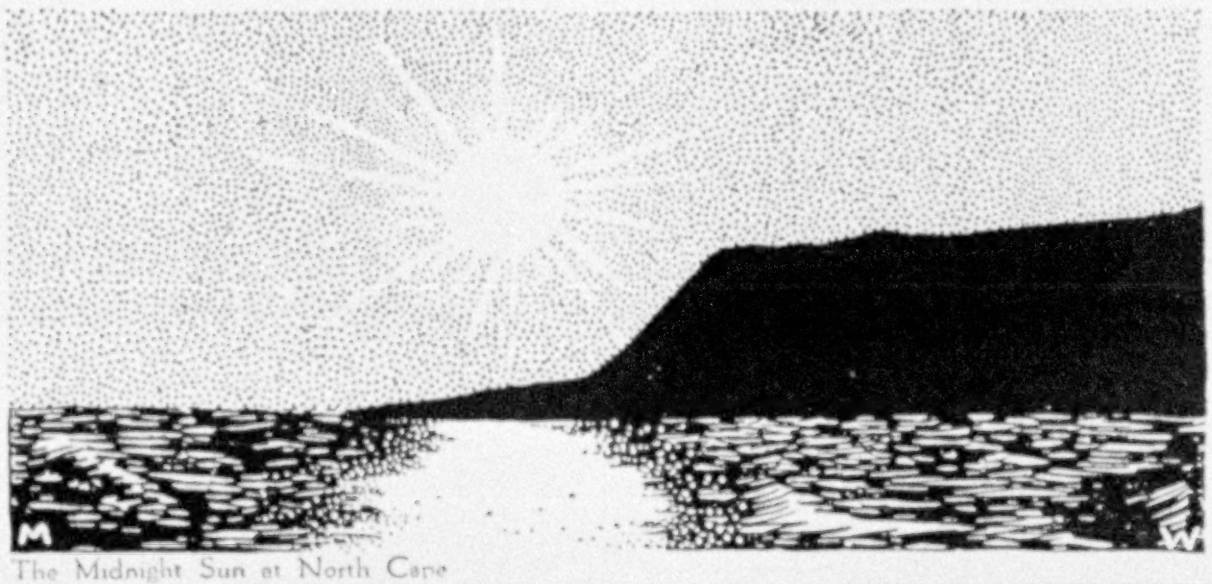

The Midnight Sun at North Cape

Summer Cruise to North Europe

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RECORD FREE

See for yourself what this new Health Builder System (records and charts, showing every movement by actual photographs) will do for you—without a dollar of expense. We will send you, *entirely free*, a sample phonograph record carrying two of the special movements, with a voice giving the directions. Get this free record, put it on a phonograph, and try it. There is no obligation—the record is yours to keep. Just enclose a quarter (or 25 cents in stamps) with the coupon, to cover postage, packing, etc. Send coupon—today—now—to Health Builders, Dept. 185, Oyster Bay, New York.

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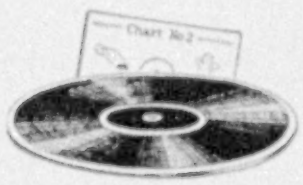

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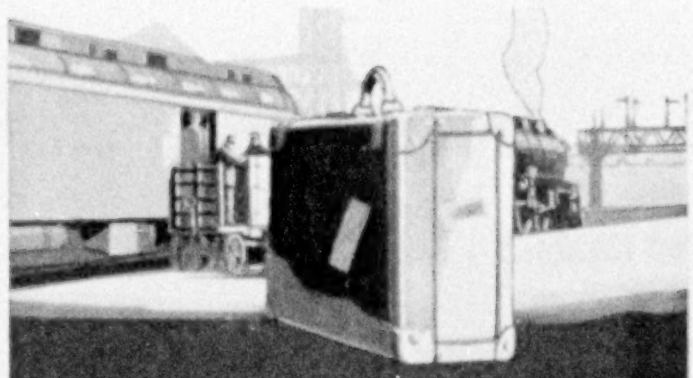

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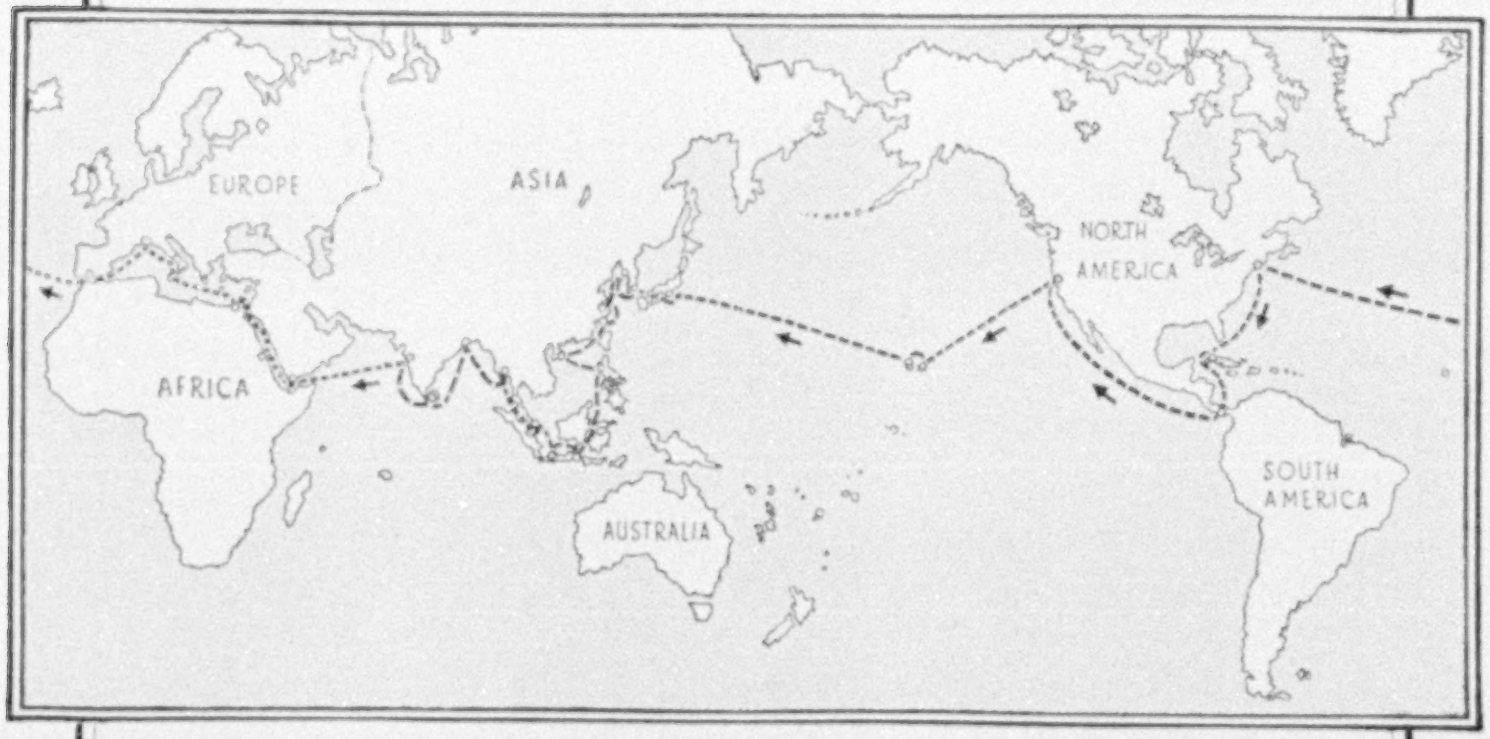

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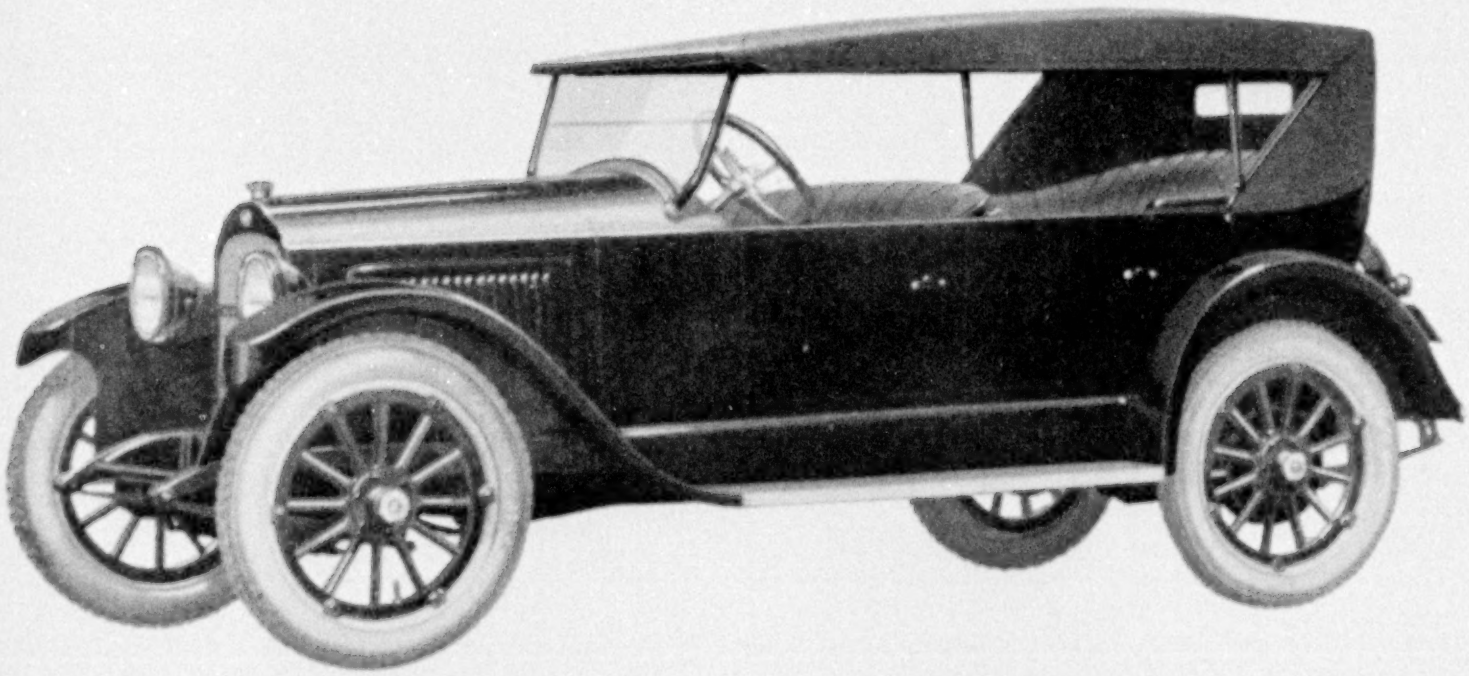

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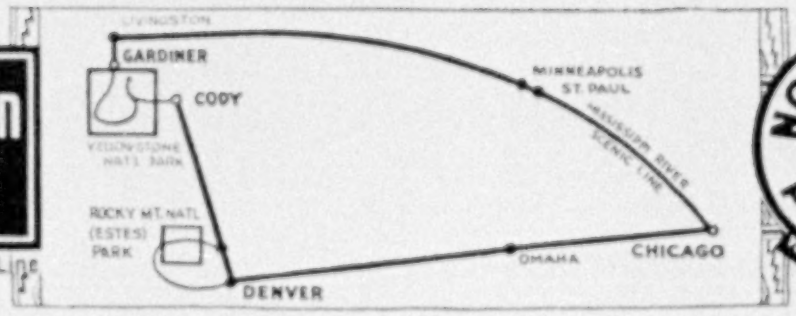

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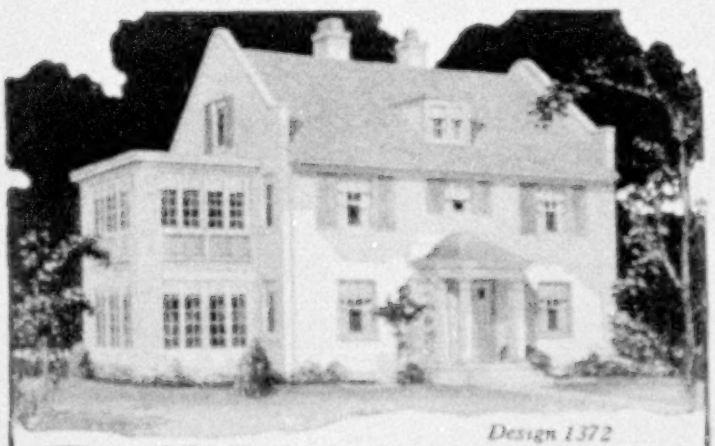

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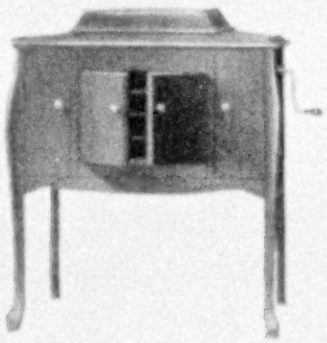

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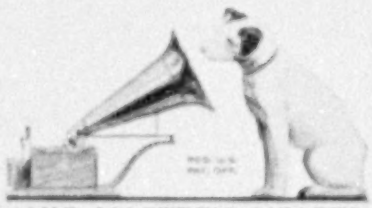

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VOL. XLI, No. 5 WASHINGTON MAY, 1922

THE NATIONAL GEOGRAPHIC MAGAZINE

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"WHERE THE MOUNTAINS WALKED"

An Account of the Recent Earthquake in Kansu Province, China, Which Destroyed 100,000 Lives

BY UPTON CLOSE AND ELSIE MCCORMICK

With Illustrations from Photographs by the Hayes-Hall Kansu Earthquake Relief Expedition

MOUNTAINS that moved in the night; landslides that eddied like waterfalls, crevasses that swallowed houses and camel trains, and villages that were swept away under a rising sea of loose earth, were a few of the subsidiary occurrences that made the earthquake in Kansu one of the most appalling catastrophes in history.

Though the tremendous shaking-up occurred in December, 1920, the story is only now beginning to spread beyond the narrow defiles which guard the entrance to Kansu Province. It is, perhaps, the most poorly advertised calamity that has occurred in modern times.

Though Kansu is within telegraphic reach of the rest of the world, the details of the disaster have never come over the wires. The native population was too stunned and the few foreign residents were too busy in relief work to give any description of the dancing mountains and vanishing valleys.

Mr. Josef W. Hall (Upton Close), who visited the earthquake area under the auspices of the International Famine Relief Committee, has brought back one of the first accounts of the devastated country and the strange things that happen when the earth turns itself into a contortionist.

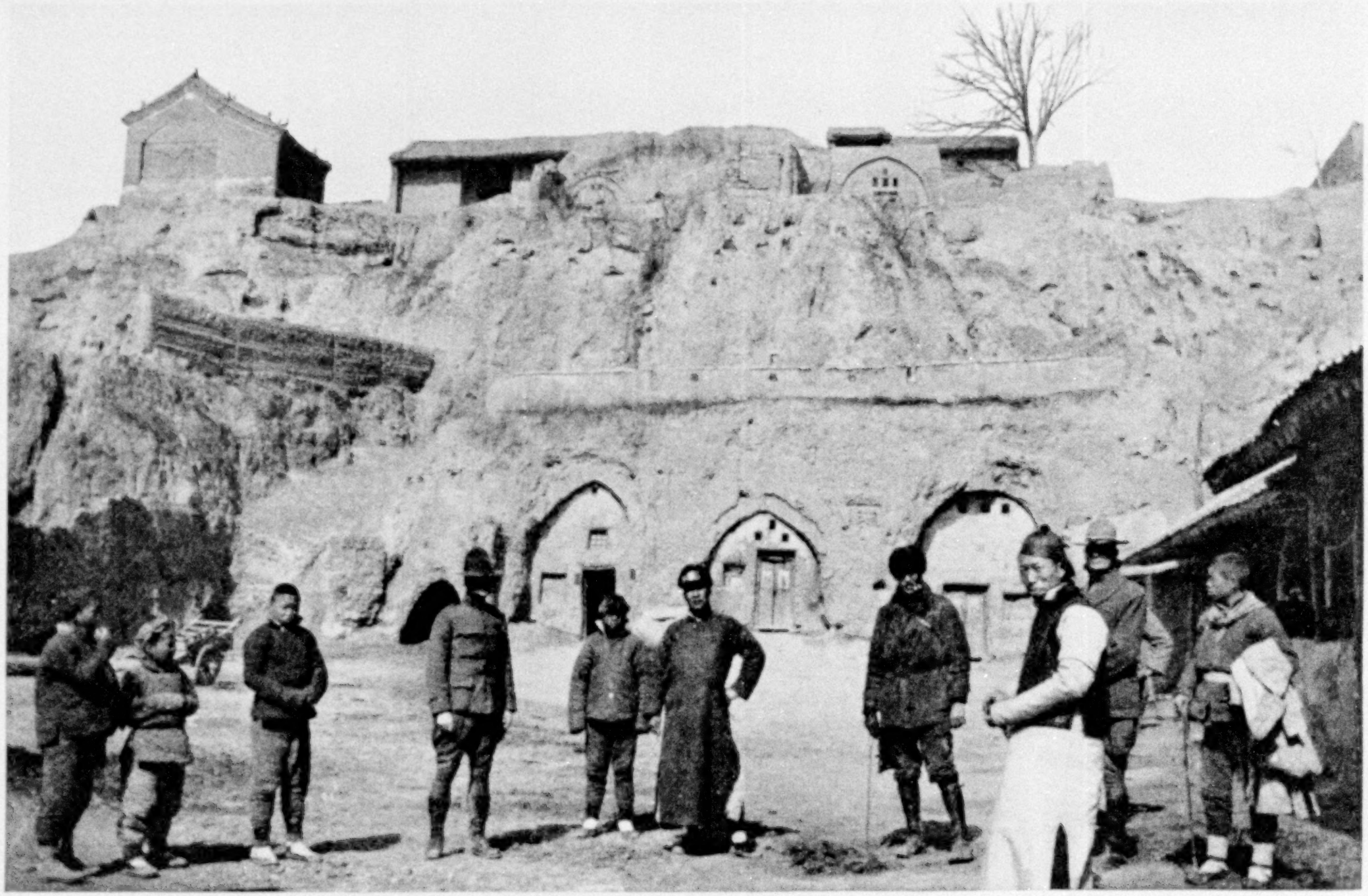
The area of destruction, 100 by 300 miles in extent, contains ten large cities, besides numerous villages. In it is the heart of the so-called loess country, where the soil is a mixture of clay and powdered quartz. A narrower region was comprised in the landslide district, where the loose earth cascaded down the valleys and buried every object in its path.

A MOSLEM FANATIC AND HIS FOLLOWERS SEALED IN A CAVE

Tales as strange as any that Roman historians have told of Pompeii are recounted by visitors to the devastated country. As three-fifths of the dead are Mohammedan, the non-Moslem Chinese claim that the earthquake was a visitation from Heaven against the disciples of the Prophet. Somehow, the Mohammedans have failed to deny this accusation with their usual vigor and have suddenly become surprisingly humble.

One of the most dramatic episodes of the disaster was the burial of Ma the Benevolent, a famous Moslem fanatic, and 300 of his followers, just as they had met in conclave to proclaim a holy war. The cave in which they had gathered was sealed by a terrific avalanche, while the group knelt on their prayer-mats.

XUM

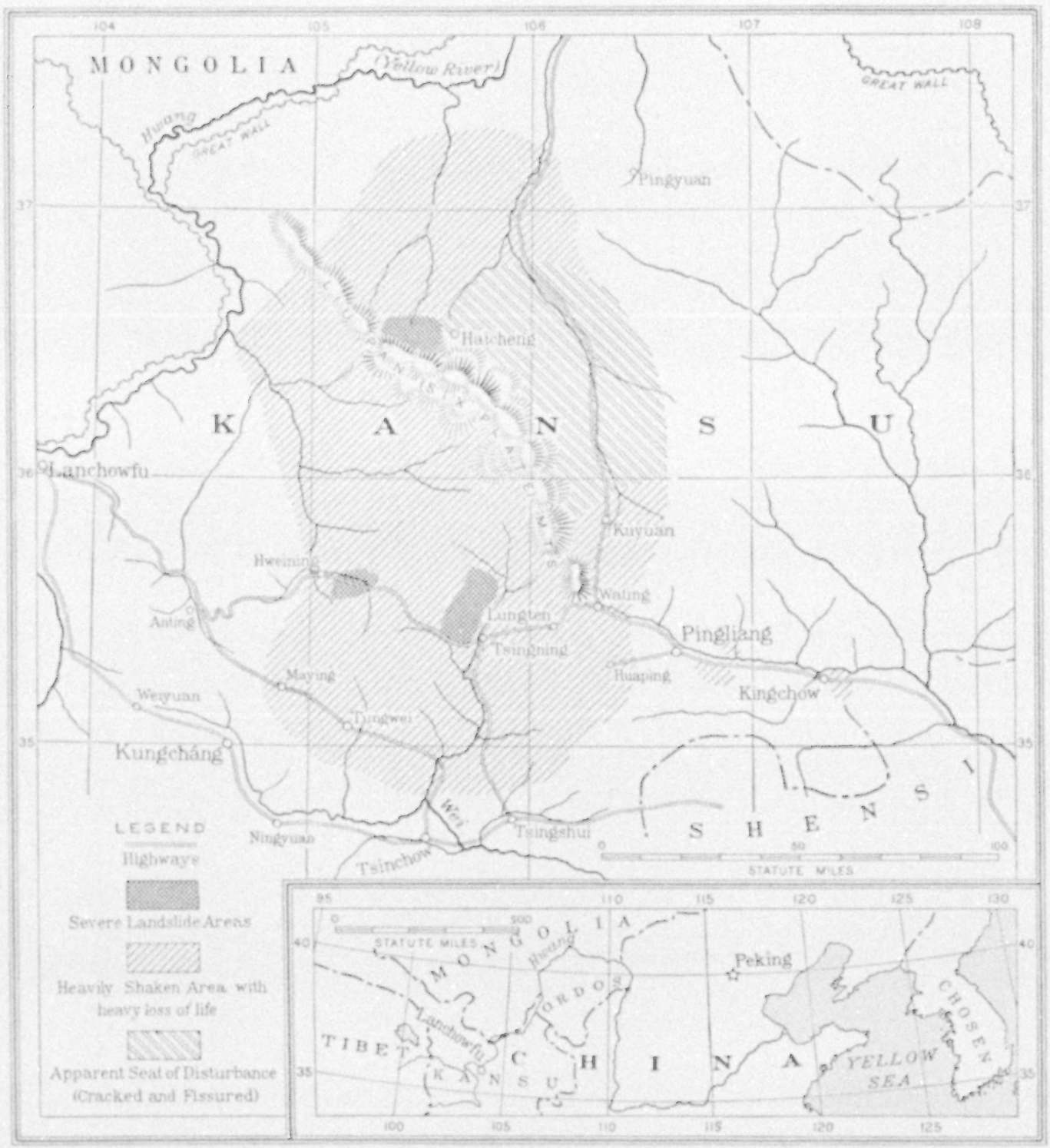


A CAVE INN IN THE LOESS REGION, WITH MEMBERS OF THE RELIEF EXPEDITION IN THE FOREGROUND

This is outside of the quake belt, but gives an excellent idea of how cave homes of the district looked before the disaster.

THE AREAS OF VALLEY-FLOOR LAND COVERED BY LOOSE LOESS FROM THE HILLS ARE TREMENDOUS

The traveler over these wastes of earth, under which are buried villages, farmsteads, stream-beds, and road-beds, is overcome by the weird feeling that he is on some planet still in the formative stage. The horses appear to have an equal sense of the uncanniness of the situation and cannot be persuaded to leave the few trails which have been pounded down over the soft, dry, treacherous earth.



Drawn from a sketch by Josef W. Hall

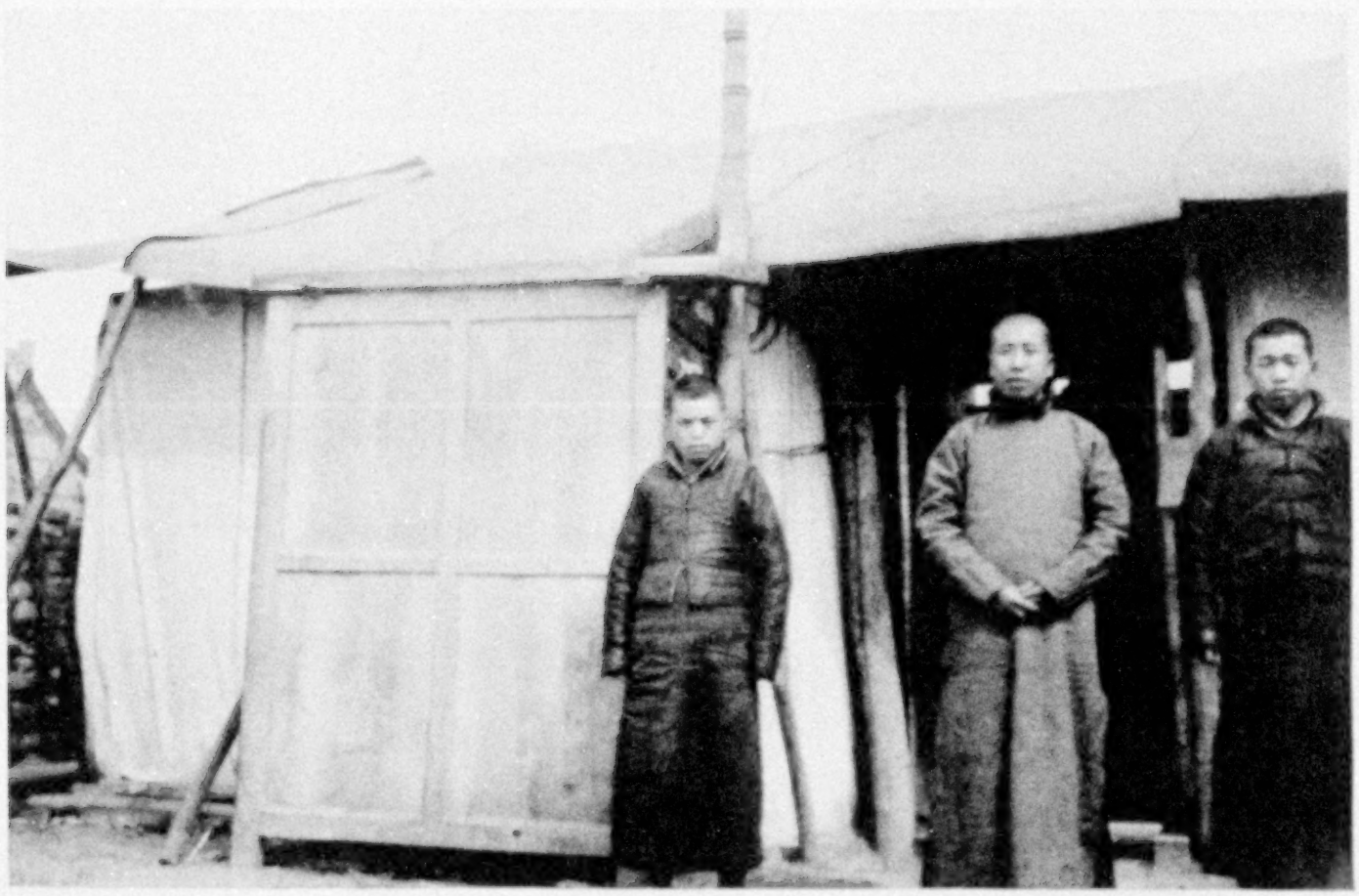
A MAP OF THE QUAKE-STRICKEN AREA IN KANSU PROVINCE, CHINA

By some miracle, the watchman at the entrance to the cave escaped with his life, but the others were buried so deeply that, despite months of digging over an area of a mile, the Moslems have failed to recover the bodies of their leaders.

A HIGHWAY RIDES ON THE CREST OF THE QUAKE

In another district Mr. Hall and his party found that a whole mountain topped by a temple had slid into a valley. A little beyond they found that a road bordered by poplar trees had ridden the crest of a slide for three-quarters of a mile, without apparent damage to the trees or even to the birds' nests in their branches. One astonished peasant looked out of his window in the morning to find that a high hill had moved onto the homestead, stopping its line of march within a few feet of his hut.

In another village the only people left alive were a couple over seventy years old. They were saved from death only by the fact that their children, displaying a



THE TELEGRAPH OFFICE OF KUYUAN, FROM WHICH THE FIRST WORD OF THE DISASTER WAS SENT OUT

The operator sat on the frozen ground with his transmitter on a bench before him. The building and all the telegraph instruments except one, as well as all lines except the one running northward to the Yellow River, were destroyed by the quake. These enterprising operators were, a month later, compelled to carry on in a shelter built of mats, cloth, and doors, since the Peking government was too busy financing war lords to attend to their plea for money to rebuild. The Chinese telegraph system, penetrating to far Mongolia and Turkestan, is little short of marvelous. Its farthest stations are as far away from Peking as London is from New York.

strange lack of filial piety, had sent them to live in a house on the outskirts of the clan village which was buried by an avalanche. The death of their descendants was taken as evidence, by survivors in the neighborhood, that Heaven had punished the family for its lack of filial respect.

SEVEN GREAT SLIDES CRASH THROUGH THE VALLEY OF THE DEAD

In the city of Tsingning the chief magistrate was found living in a canvas tent over his demolished yamen. In the same city two American women missionaries were dwelling in a hovel with earthern floor and a mat-shed roof that would be scorned by well-bred live stock. Though they had been offered better quarters, the mission workers had refused to accept them, preferring to share the hardships of their people.

The most appalling sight of all was the Valley of the Dead, where seven great slides crashed into a gap in the hills three miles long, killing every living thing in the area except three men and two dogs.

The survivors were carried across the valley on the crest of the avalanche, caught in the cross-current of two other slides, whirled in a gigantic vortex, and catapulted to the slope of another hill. With them went house, orchard, and threshing-floor, and the farmer has since placidly begun to till the new location to which he was so unceremoniously transported.

In a small town on the highway two strangers had put up at the inn on the evening of the disaster. In the terror and confusion that followed the earthquake, the landlord completely forgot his two guests. It was not until several days later that he remembered them, and when,

ALL THAT IS LEFT OF THE TERRACED FIELD IN THE MIDDLE DISTANCE IS THE LITTLE ISLAND OF EARTH

Apparently the island is firmer than the earth on either side of it, for it divided the avalanche of dirt into two mouths.

AT THE FOOT OF A SLIDE WHICH BURIED A VILLAGE ON THE VALLEY FLOOR

The few survivors, following instinct, endeavored to remain as near as possible to the original site of their homes, and at the foot of the slide erected hovels, in which they spent the winter. Shocks were so recurrent that the survivors feared to erect structures substantial enough to do injury should they collapse. As a result, many perished of the cold during the severe winter (the altitude being from 4,000 to 6,000 feet above sea-level). The usual heated-brick beds, or kangs, were not installed in the inadequate shelters for fear of repetition of the casualties which occurred when the kangs broke through during the quake and dropped the sleepers, mostly women, into the fires below.

after considerable digging, their room was brought to light, both men were found alive. Stupefied by the shock, they knew nothing of what happened and imagined that they had slept through an ordinary night. The landlord, however, in spite of remonstrances, did not neglect to collect room rent for the full period of their stay.

One of the districts that has suffered most is the tableland to the north known as the bunch-grass country, which supplies the camel crop for practically all of Asia. The soil is an unyielding alkali, which cracked appallingly, since there was no loess cushion to mitigate the force of the shock. In one town with a normal population of several hundred the investigators found only twenty or thirty survivors.

The loss of nearly two hundred thousand lives and the total destruction of hundreds of towns and cities calls for reconstruction work on a staggering scale. Seven thousand men have been employed by the United International Famine Relief Society in releasing dammed streams and thus preventing disastrous overflows. Their work and that of their brave foreign superintendents, now nearing successful completion, is a romance of adventure in itself.

Fortunately, there is no orphan problem, as children in the devastated districts were so much in demand that they were promptly adopted by the survivors. In Kansu, as in most pioneer countries, men are so much in the majority that women are highly valued. The usual price for a wife ranges from 100 to 300 taels, and, as a result, girl babies are adopted as eagerly as the boys.

THE CHINESE DRAGON WAGGLES HIS TAIL EVERY THIRD CENTURY

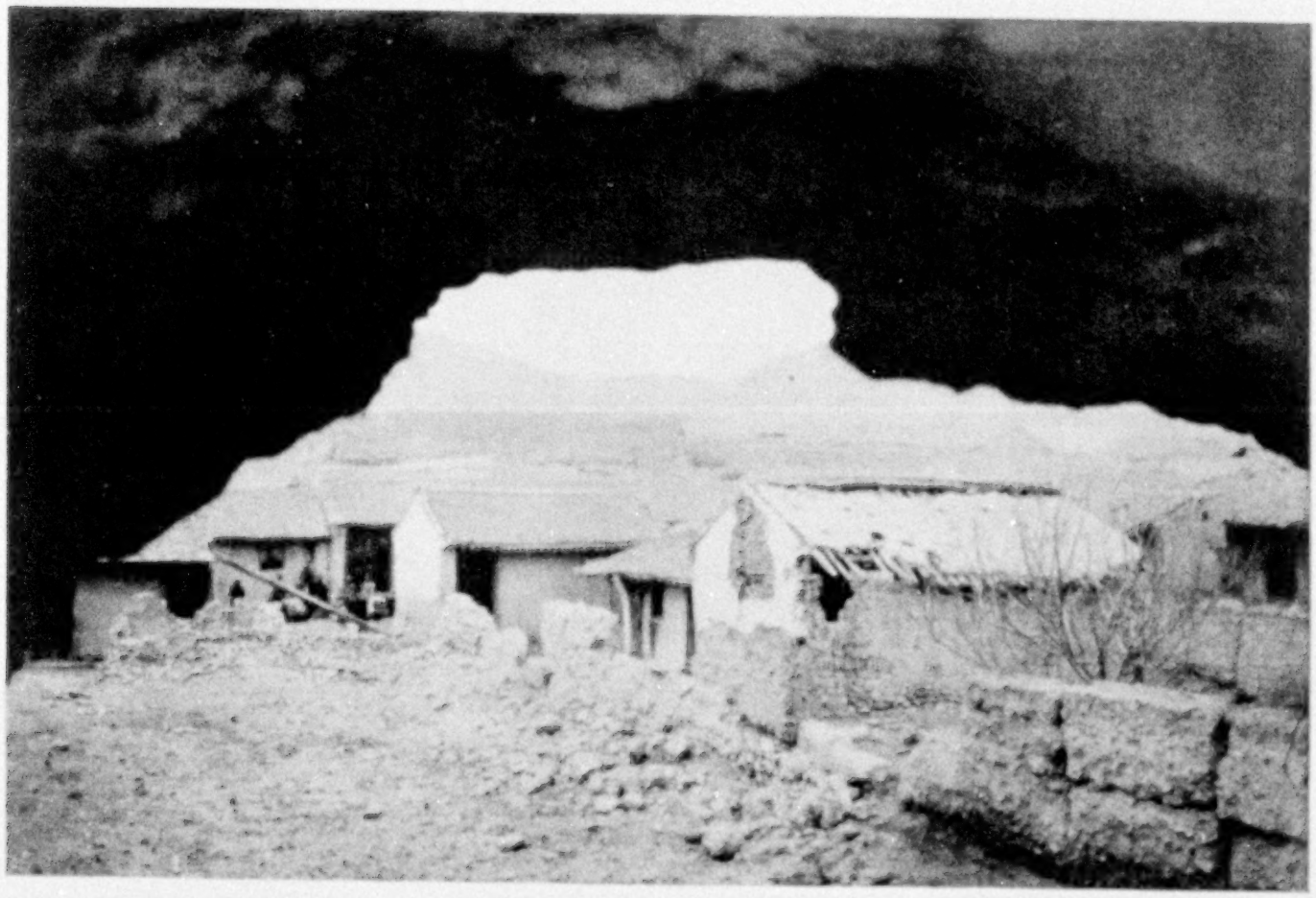
Of that most remarkable series of seismic disturbances which occurred throughout the world in November and December, 1920, the most phenomenal was

THE MAGISTRATE OF TSINGNING LIVES IN A TENT ON THE SITE OF HIS RUINED YAMEN (COURT BUILDING)

This official is codirector of the relief work in his district. His wife, an unusually progressive woman, and his son are also shown in the picture.

A THRESHING-FLOOR, ONCE LEVEL AS A DANCING FLOOR, CRACKED UP INTO MANY LEVELS BY THE QUAKE

Note the effect on the compound wall. Six hundred sheep were buried in the collapsed caves at the rear.



LOOKING INTO THE RUINED TOWN OF WATING THROUGH A HOLE SHAKEN THROUGH THE CITY WALL BUILT OF LOESS

This was one of the freaks of the disaster. Some of the buildings in the foreground have been repaired.

undoubtedly the great Kansu earthquake of the late evening of December 16.

Owing to the unusual character of the loess, under the immense deposits of which the rockslip occurred, fantastic effects were produced upon the surface of the earth which give the observer the weird feeling that he is on some planet still in the formative stage.

The subterranean dragon of Chinese cosmology who, according to the northwest China tradition, waggles his tail every three hundred years, this time played havoc, such as was never before recorded with the face of the earth and the habitations of men. Likely no other earthquake in scientific annals ever changed the *physical geography* of the affected region to the extent of the Kansu cataclysm.

The region is one of seismic disturbance, but local archives, purporting to register the events of the past four thousand years, record only two earthquakes approximating the recent calamity in destructiveness. One was in the Tang dynasty, 1,200 years ago, affecting most severely an area in the north of Shensi Province, 200 miles to the east of that now in ruins; and the other under the Mings, three hundred years ago, which struck southeast, from the Kansu border to Sianfu. Ancient monuments and works of sculpture still bear mute evidence to these two disturbances.

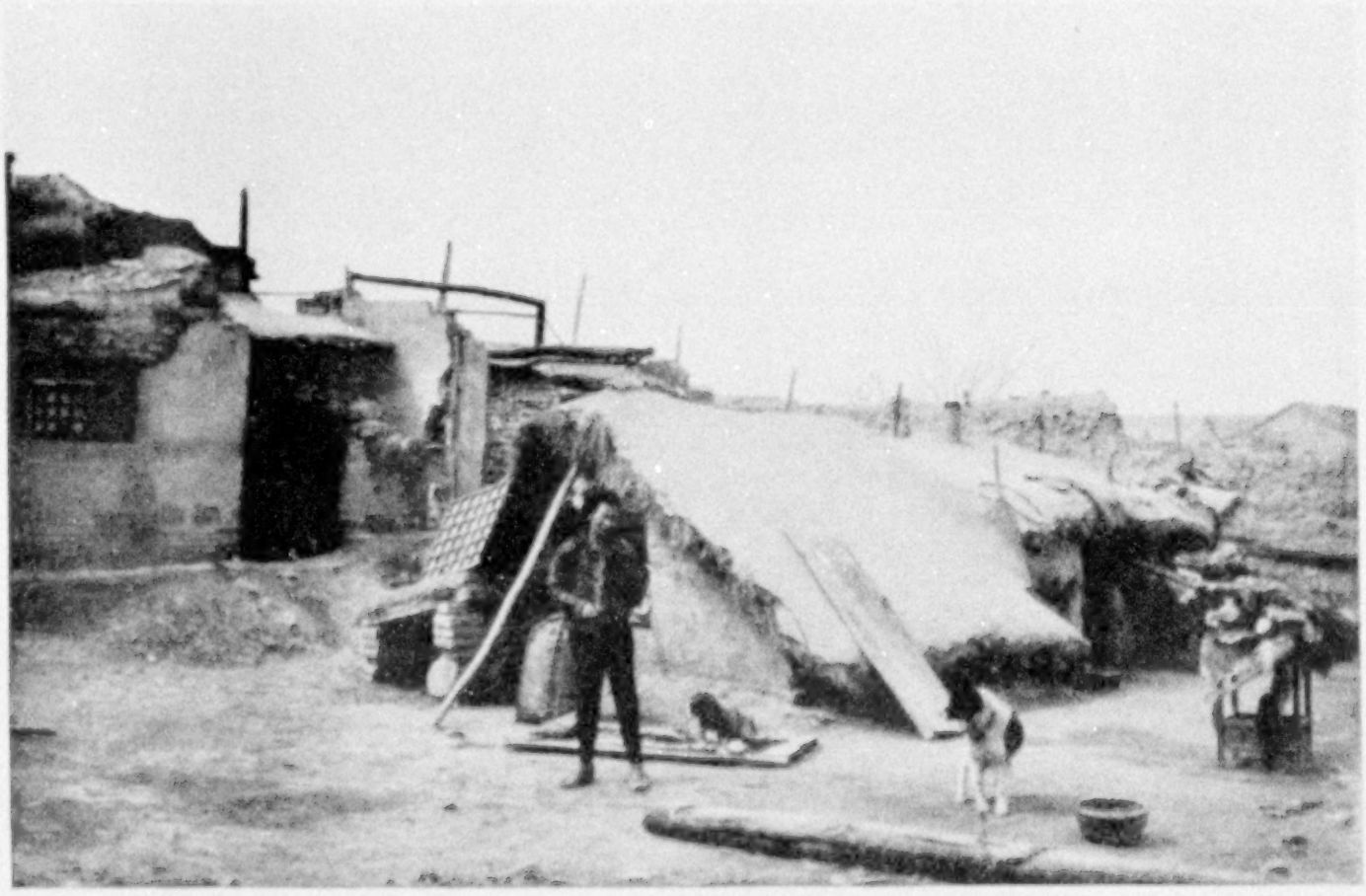
The area most heavily affected by the recent disaster—what one might call the area of supreme destruction, where no brick-and-mud building was left in a habitable condition—is, as shown by the accompanying map (page 448), an oblong lying between the Wei and Yellow rivers, 170 miles long and 150 miles wide. It comprises two distinct types of geological formation, at least on the surface, which fact adds great variety and interest to the occurrence.

"THE FOOTSTEPS OF THE GODS"

The southern half of the oval, stretching from the northern bank of the Wei River to Kuyuan, is, with the exception of the precipitous mountain range cutting it from north to south not far from its

SAVED BY INCHES

Here the "mountain walked" from the range seen in the background, three miles distant, across the valley and towered over the village wall of Swen Family Gap, sparing the farmyard and haystacks of the peasant seen in the picture (see text, page 463).



TEMPORARY HOVELS OCCUPIED BY REFUGEES

WHERE THE BRITTLE GROUND CRACKED LIKE A PORCELAIN DISH

It took months to build a road with a dependable surface through this area, and even now a camel or horse will sometimes sink a leg through into some hidden crevasse. Shocks still recur in this district. They are attended by noise, and the earth trembles as if a fast train were passing underneath.

eastern edge, a part of the great loess region which stretches from central Honan almost to Tibet.

It is in the loess area that the immense slides out of the terraced hills occurred, burying or carrying away villages, covering level, farmed valley floors with a debris of unvegetated dust, damming stream-beds and turning valleys into lakes, and accomplishing those hardly believable freaks which the natives name the "footsteps of the gods."

Here the Chinese, since their vernacular is devoid of a technical or other term corresponding to "landslide," have coined the expression—the only phrase they have for describing what has happened—"The mountains walked" (*Shan tso-liao*).

The northern half of the oval, from Kuyuan to the Yellow River, is a rolling alkali plateau of clay and gravel formation, a part of the steppes stretching north to Siberia and west to Turkestan. In this district the soil, being of brittle but firmer texture than the loess, did not slide, but cracked into intricate fissures.

The summits of the high Six-Plate (*Liu Pan*) range, consisting of rock of volcanic origin protruding several thousand feet above the loess deposits on either side, although in the heart of the earthquake belt, were not shaken seriously. The slip apparently occurred in the rock-bed underlying the hard plateau and the loess, and sent vibrations to the surface in varying degrees of intensity, according to the nature of the soil and the thickness of the loess blanket, which acted as a cushion. The vibration was only slightly transmitted to the volcanic strata of the mountains.

NEWS OF THE DISASTER LONG DELAYED

The remoteness of the district in which the earthquake occurred cannot but intrigue interest. Although the concurrent quakes in Chile and Salvador, the tidal wave of Yap and the eruption of Mt. Asama, Japan, are all history, the Kansu disaster is still news. What actually happened in this frontier province of China is only now, through the reports of the

A VILLAGE IN THE HARD-HIT MOSLEM AREA

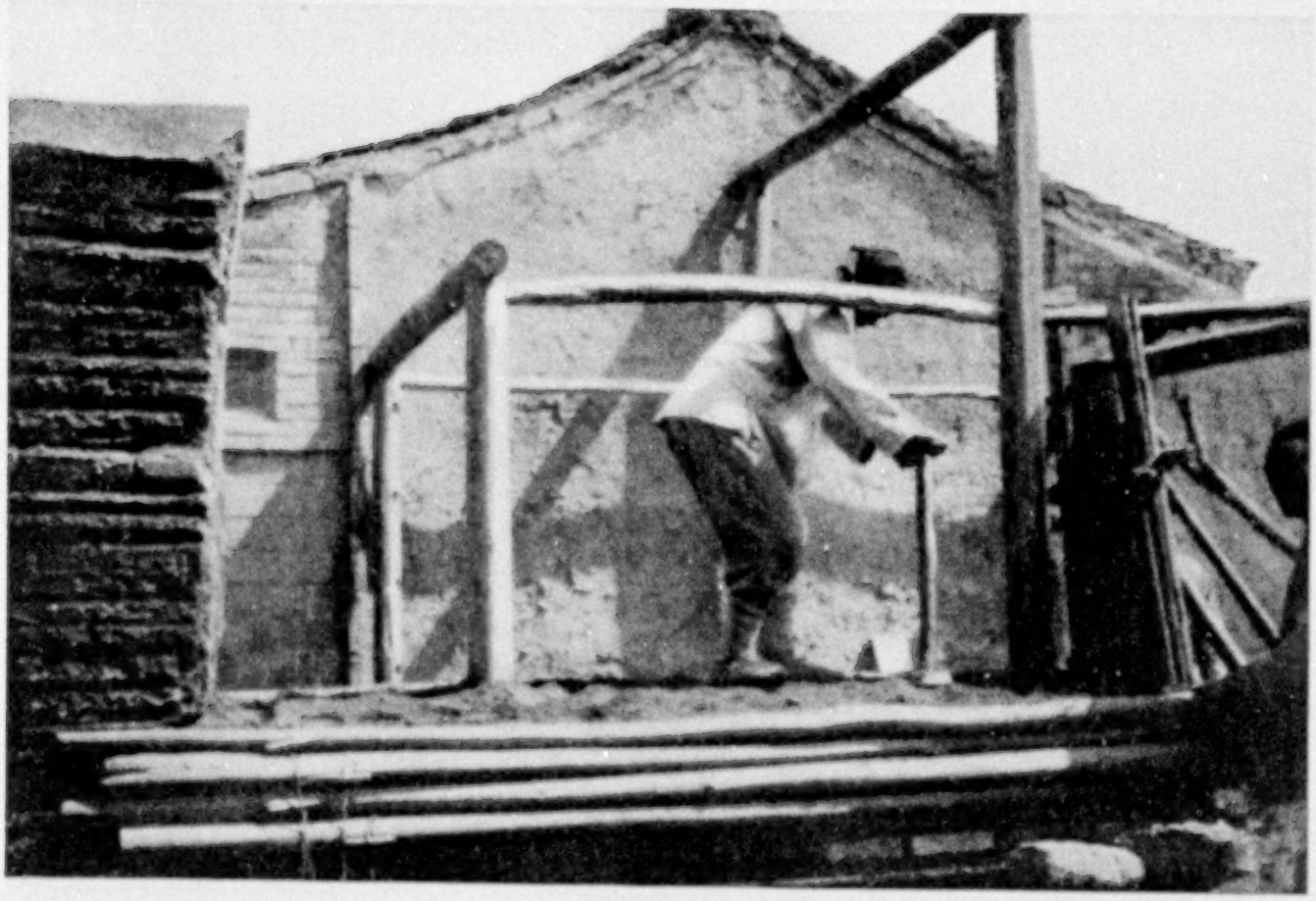
Bodies of men from the ruined homes to the right were left in the main street. The wall to the left was erected after the disaster but partially destroyed by a succeeding shock.

TWO PEOPLE SURVIVED IN THE VILLAGE WHICH ONCE OCCUPIED THIS SITE

The family of the Du's, as well as their clan village, lies under this pile of earth, with the exception of this house on the outskirts occupied by the old grandfather and grandmother. It was covered at the rear and one side as high as the ridgepole (see text, page 448).

RUINS OF LUNGTEH YAMEN

The magistrate was absent from his post at the time of the disaster, but his wife was killed.



MOLDING WALLS OF LOESS

The method is not greatly different from that employed in the Occident in making concrete structures. The loess wall will last, apparently, almost as long as concrete, if not exposed to over-much moisture.

A GASH IN THE HILLS LEFT BY A LANDSLIDE WHICH COVERED A VILLAGE

AT THE FOOT OF THE SLIDE SHOWN IN THE PICTURE ABOVE

The earth spread out over the valley floor, completely obliterating the original topography, including river-bed and highway. Travelers are seen making their way along the new road which is being gradually packed down over the soft earth. The wave trough and vortex formation taken by the torrent of earth is plainly discernible. The scaly appearance is caused by the broken-up valley floor sod. The avalanche plowed its way under the sod.

A HIGHWAY CARRIED ONE MILE ACROSS COUNTRY

This was the most striking freak of the earthquake. A quarter-mile section of an old road, with the big poplars which line it, was cut off from the highway by a landslide and carried on the back of the river of earth for nearly a mile, where it was left in an almost natural position. All this took place in a few seconds of time. The conformations and waves into which the swirling earth resolved itself are plainly seen.

relief investigation expedition of which Mr. Hall was a member, being made known in any comprehensive way, even in China's capital and port cities.

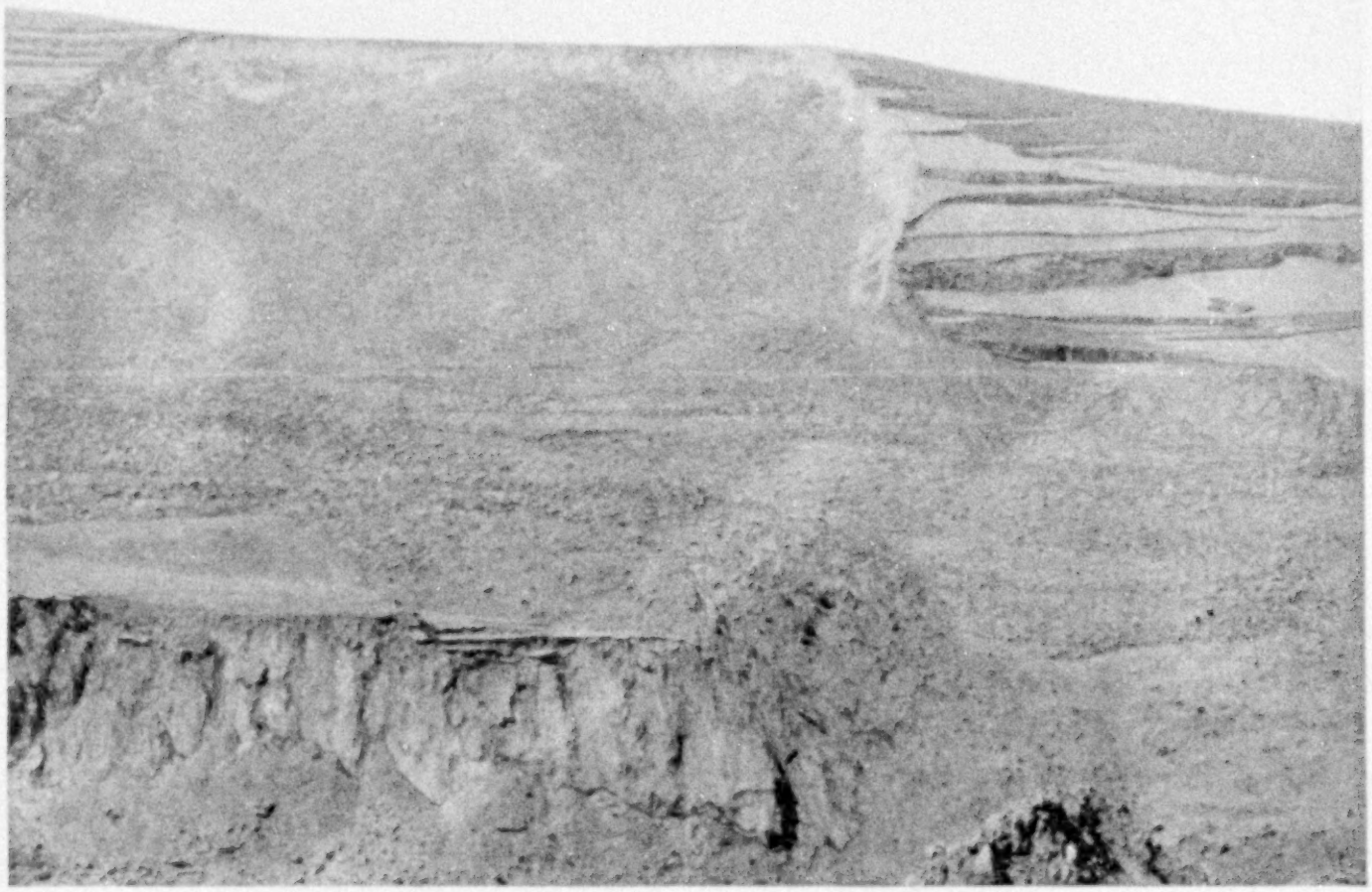
Kansu, in ancient times the buffer state between the glorious seats of the old Shensi dynasties and the Tatar and Tibetan barbarians, lies to the west of Shensi and northwest of Szechwan, pinched between the Ordos and southern Outer Mongolia on the north and east and the Kokonor region of Tibet and Sinkiang province of Chinese Turkestan on the south and west.

It is a country of extreme ethnographical and religious interest, being the meeting and mixing place of Buddhist Tibetans and Mongolians, Mohammedan Chinese containing a Caucasian strain, and the ordinary Chinese of the "big-church."

Had the quake disaster struck several hundred miles to the north, west, or south, the loss of life would have been negligible. As it happened, it selected for destruction, in the agriculturally rich, terraced loess country of the southern half of the affected area, the most populous portion of the province; and to the north, although this part is principally uninhabited grazing land, several of the largest Mohammedan Chinese cities, which were leveled.

Although the density of population is not more than one-tenth that of Shantung or the East China plain, the loss of life from landslides, collapsed cave homes, and falling buildings, together with death from exposure of the unsheltered in midwinter in this high altitude, was, according to official figures, 200,000, and according to the estimate of the foreign investigators more than half this number.

The reverend John D. Hayes, of the United International Famine Relief Committee, Peking, and Mr. Hall, leaving the Kwanyintang, Honan, railhead on March 6, 1921, took the ancient royal highway through Shensi to Kansu, crossing the Kansu border near Kingchow and proceeding directly to Pingliang, the great



IN SOME CASES THE HILLSIDES SLID AWAY, LEAVING GASHES THROUGH THE TERRACED FIELDS AS REGULAR AS IF SCOOPED OUT BY A GIGANTIC TROWEL

A MOUNTAIN STREAM DAMMED UP BY A LANDSLIDE OUT OF THE HILLS

Excavators are seen in the background working to release the waters which have formed a lake. The water is likely to break through the loess at unexpected places and times.

trade mart of the western half of the province.

The first damage done by earthquake was found to be among the ancient tablets of Hwa Yin Temple, lying under the shadow of sacred Hwa Mountain, not far beyond the Honan border.

In Sianfu, the capital of Shensi, some damage was done to houses, but there was no loss of life. Lesser destruction was wrought in spots between Sianfu and Pingliang.

In the vicinity of Tsingning and Pingliang, five to six thousand feet above sea-level, cave-dwellings in the loess cliffs collapsed, causing great loss of life among the peasants, who principally inhabit this style of home. Cattle, horses, and herds, stabled and folded in caves, were buried alive.

Passing Pingliang, the investigators found themselves in the belt of complete destruction, where cities as well as peasant villages suffered heavy loss of life and all buildings were leveled.

At Wating, where the highway forks, one road going north to Kuyuan and the Mohammedan region along the Yellow River and the other west to Lanchowfu and Turkestan, we obtained our first photographs of a ruined city. Taking the road to the provincial capital (Lanchowfu), we soon ascended Six Plate Mountain. With the elevation, evidence of seismic disturbance grew less, to become again abundant when the loess foothills of the west descent were reached.

IN THE DISTRICT WHERE "THE MOUNTAINS WALKED"

Two of the hardest-hit cities, Lungteh and Tsingning (which, being interpreted, mean, respectively, Virtuous Dragon and—paradoxically—Quiet Peace) were passed, and then we visited the district where "the mountains walked."

Following the Sianfu-Lanchowfu-Turkestan highway, we ascended a small valley of steep grade directly west of Tsingning. Suddenly the highroad for a length of a quarter of a mile dropped out of sight. It had been cut as if chopped off with an axe, leaving the fifty-year old poplars and cottonwoods with which it is lined partly uprooted, like sentinels stricken at their post, upon the edge of the sixty-foot gully which occupied the position of the road.

The roadside water-supply of a near-by village had disappeared down this same gully. The natives were carrying their water from a new lake a mile to the south, in the center of the valley.

Making his way over the rent terraces to this lake, which had been formed by the damming up of the valley stream by a two-mouthed slide from the hills on the opposite bank, Mr. Hall procured what are, perhaps, the three most explanatory illustrations (pages 450 and 460).

THE CLIMAX OF DESOLATION

The short valleys in this section join one another like links in a chain. Riding to the summit of the divide which separated this from the next link, we were amazed by the panorama of a valley filled with the loess dust and clouds of seven tremendous landslips which had come out of the hills on either side. This little nook in the hills, some five miles long, known as the "Teng Clan Draw," had become in verity the climax of desolation.

Hardly enough valley-floor land remained uncovered for one good kitchen garden; several peasant settlements lay buried beneath the debris; one "village of the dead," containing not a single survivor, lay in ruins.

A lone mound of fresh earth—the grave of one of the few victims who have been excavated—stood between the ruins and a thirty-foot precipice cut by the slide which had just missed the village. From a reed stuck in the earth hung a paper strip bearing the inscription: "The Eastern Lord of the Church, if you seek and call, may save your bitterness." The dead was Mohammedan.

THE FIRST SHOCK CAME AT 9:30 IN THE EVENING

The only survivors of this valley were saved as if by miracle—a husbandman and his two young sons, whose farmstead, instead of being buried, was caught upon the back of one of the slides, carried half a mile down the valley to where it was diverted by two streams of earth coming from other directions and, as the resultant of the two forces, was pushed another quarter of a mile up a small draw.

XUM

RELIEF WORKERS DIGGING TO RELEASE WATERS BEHIND A QUAKE-MADE DAM

The earthquake made this dam of millions of tons of loose earth, stretching from valley-side to valley-side, in a few seconds of time.

FROM THE TOP OF THE DIVIDE OVERLOOKING THE VALLEY OF DEATH

The terraced hillsides showed seven immense gashes, out of which had poured the loose earth deluging the valley floor and burying farms and villages.

These persons, like all others in the slide zone, were unaware of the nature of the disaster which had overtaken them until the following morning. The earthquake, registered by the fine seismograph of the French fathers of the Sikawei Observatory at Shanghai at 8:09 p. m., December 16, occurred in Kansu between 9:30 and 10 o'clock, sun time, when all persons and animals were housed. A bitter cold wind and dust storm, raging at the time, added to the blackness of the night.

The survivors say that they heard a tremendous underground roar and felt the shock, which seemed to them to consist of a sickening swing to the northeast and a violent jerk back to the southwest, lasting half a minute. They made all ordinary efforts to save themselves, and between successive tremors following the main shock huddled back into the ruins of their homes to await the morning.

Not until day dawned and they crawled out to find neighboring villages obliterated, farm lands carried away or buried, streams blocked, and hills of earth towering above their compounds did they apprehend that the "hills had walked."

It was in this Valley of the Dead that the most arresting freak of the cataclysm occurred. Two sections of the ancient, well-packed highway, accompanied by the tall trees which bordered it, were cut from the line of road following the side hill, swept hundreds of yards over the stream-bed, and set, intact, upon an angle on top of the heap of loose loess.

It took weeks to reëstablish communications over these breakages—to rebuild telegraph lines and pack down trails on which horses would not sink to their bellies and carts to their hubs.

THREE LAKES ARE FORMED

The valley of desolation opened at its western end into a wider, more gradual valley of horseshoe shape, through which we semicircled to the south upon our return to Tsingning.

At the junction of the valleys stands Swen Family Gap, a town of several thousand souls, in which one-tenth were killed by collapse of buildings and cave dwellings; and the other nine-tenths were saved by the miraculous stoppage of two bodies of earth shaken loose from the mother hill and left hanging above the village, lacking only another half-second's tremor to send them down. A third avalanche, having flowed from the hills on the opposite side of the valley across the valley floor and the stream-bed, is piled up in a young mountain near enough to the village to overshadow the wall.

RESCUED GODS OF A RUINED "THREE-DIVINITY" TEMPLE

Airgod and Watergod were excavated unscathed, although the temple was smashed; but Earthgod, significantly, was destroyed. Chinese tenacity and persistence in the face of difficulty are illustrated by this erection of an altar from the broken tile of the destroyed temple.

Our route through this larger valley led us past three lakes formed through the blocking of the stream by five enormous slides.

Some of the scooped-out places left by these slides were half a mile in width at the mouth, extended back into the hills for a mile, and furnished enough dirt to cover several square miles of valley floor. Some were as regular as if they had been made with a gigantic trowel, while others were as ragged as if they had been ripped out of the hills by the teeth of some monster.

In each case the earth which came down bore the appearance of having shaken

loose clod from clod and grain from grain, and then cascaded like water, forming vortices, swirls, and all the convolutions into which a torrent might shape itself.

One of these slides pouring down upon a village had buried every building except one inhabited by the old progenitors of the clan. This lone patriarchal home stood on the outskirts and was half covered.

Hay and grain were mingled and mixed with the earth over a distance of half a mile, showing how the dirt had "worked" in its descent. On the opposite side of this slide a threshing-floor carrying several stacks, and an apricot orchard, had come down intact.

The cattle had been so caught in the slide that their limbs or heads protruded, and these had been cleaned by the packs of dogs which roamed the country. Ridge-poles of dwellings turned to sepulchers showed above the ground.

Two slides causing the lowest of these blockades, coming from the sides of the valley, buried a village of several hundred persons, converted a shapely, high loess butte into a ragged mound, and created several miles of lake out of rich valley farms.

The local authorities, realizing the danger of destructive washouts if these blockades were not opened before the late summer torrents, had, before the arrival of outside relief, made such pitiably insufficient efforts as were at their command toward the release of the dammed-up waters. Their efforts, upon recommendation of the expedition, were incorporated in the work of the relief societies.

WHY THE CHINESE CONSIDER THE CALAMITY A BLESSING

Conditions in a score of small valleys in the Tsingning and Hweining neighborhoods are similar to those in the three here described. There is probably no other area, however, where within a half-circle of twenty miles' diameter one may count seventeen immense landslides.

A hundred miles farther west, near Hweining, a bad slide district exists, and some sixty miles north of Tsingning three bad slides occurred, one of which is responsible for the dramatic incident of the burial of Ma the Benevolent, radical Mohammedan leader, while in a cave-mosque with his retainers for the purpose of consecrating his proposed Jihad against the non-Mohammedan Chinese (see text, page 445).

It is this incident which gives the Chinese cause to rate the earthquake as a blessing, for their experience of fifty years ago taught them that while "Heaven slays its hundreds, the Moslems massacre their ten thousands." The damage done to the Mohammedan settlements is in general more severe than that suffered by the Chinese farther south.

ALL CAVE DWELLINGS COLLAPSED

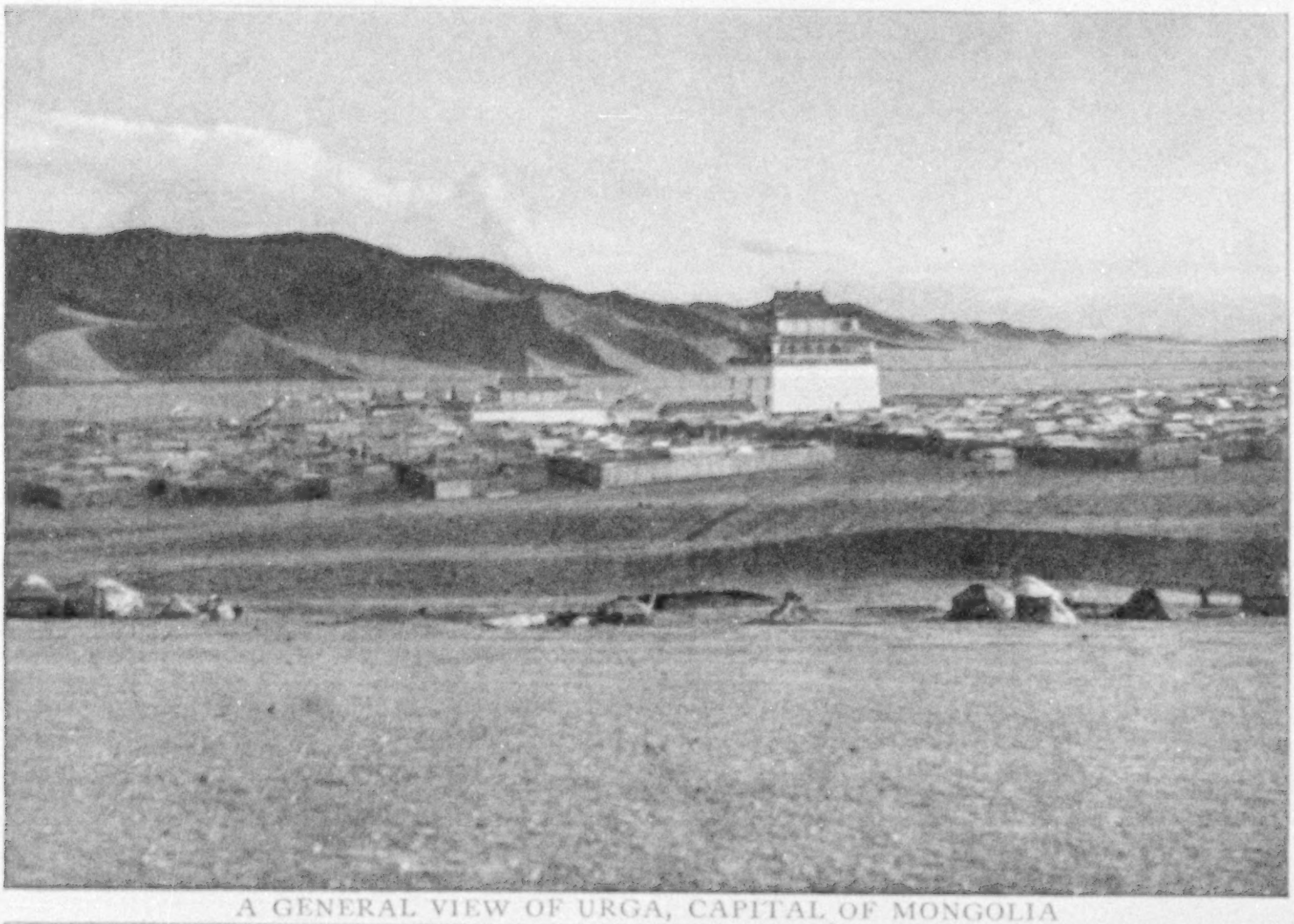
Leaving the Tsingning area, we traveled many miles north to Kuyuan, the largest of the ruined cities and one-time seat of the imperial resident, beyond which we trekked through the hardest shaken section of all. Here the friable loess gives way to the brittle clay-gravel-alkali bunch-grass country, which was too solid to slide, but which cracked like a porcelain dish hit with an immense weight.

Cave-dwellings without exception gave way, not one mud brick remained upon another. Even city walls collapsed, as in Heh Cheng-tze (Black City) and Hai-cheng.

Nine-tenths of the people of this district were in mourning when we arrived, and there were many new Moslem graveyards. In one cave-village of eighty inhabitants, sixty were entombed, but half were dug out alive by the remaining twenty.

In another town, Yang Loh-chwang, 80 per cent of the residents perished. The remaining townsmen lacked even the heart to bury the dead animals pulled out of the debris, and at the time of our visit three months later, carcasses of human and animal victims still lay rotting together in the streets.

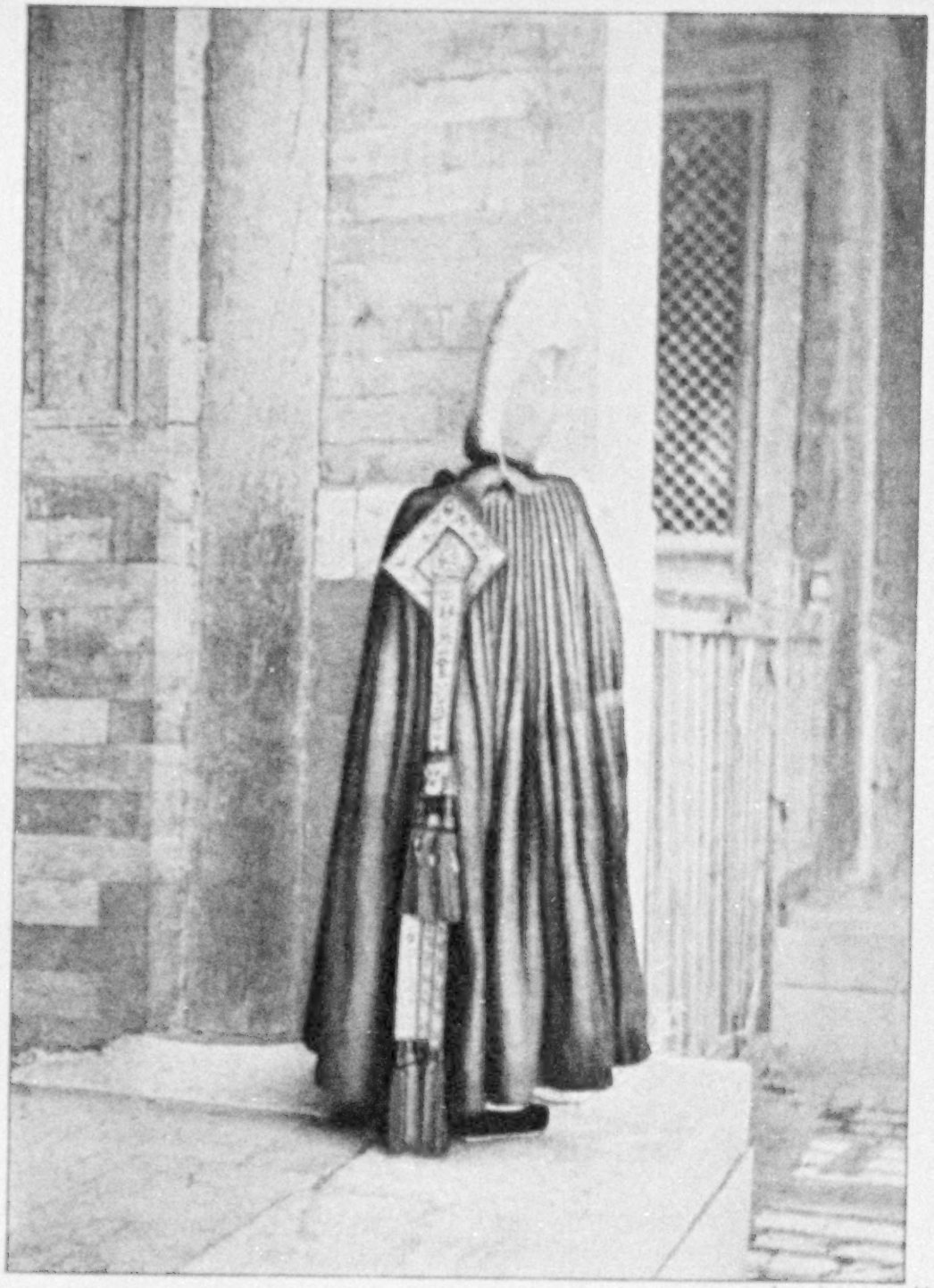
Such were the scenes of desolation which met our eyes until we emerged suddenly upon the bank of the Yellow River, irrigated and made attractively fecund by the enterprising Mohammedans. Here evidences of the disaster vanished as abruptly as they had appeared at the Kansu border.



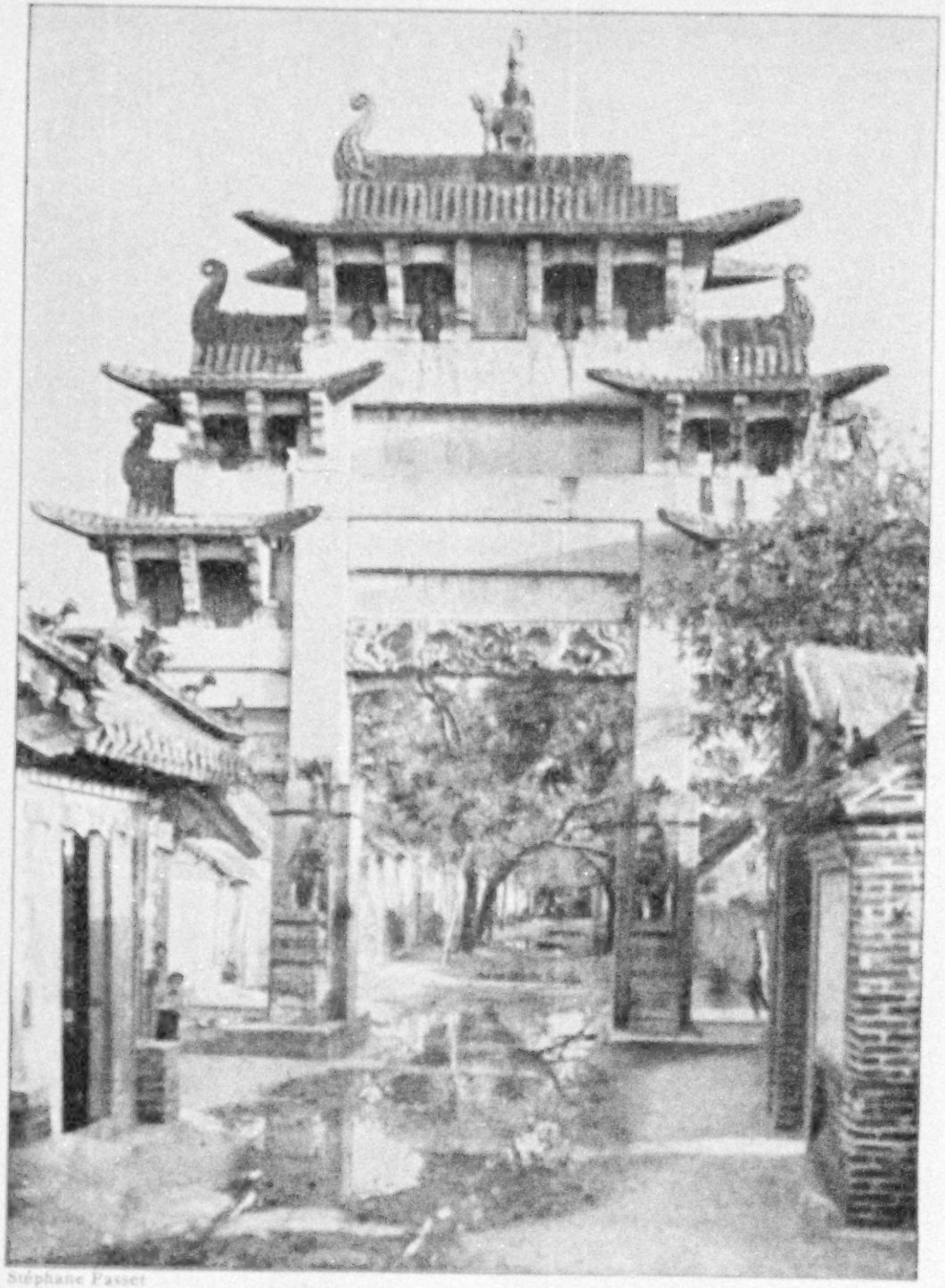
A GENERAL VIEW OF URGA, CAPITAL OF MONGOLIA

Autochromes by M. Stéphane Passet

MONGOLS AWAITING THE ARRIVAL OF A LIVING BUDDHA



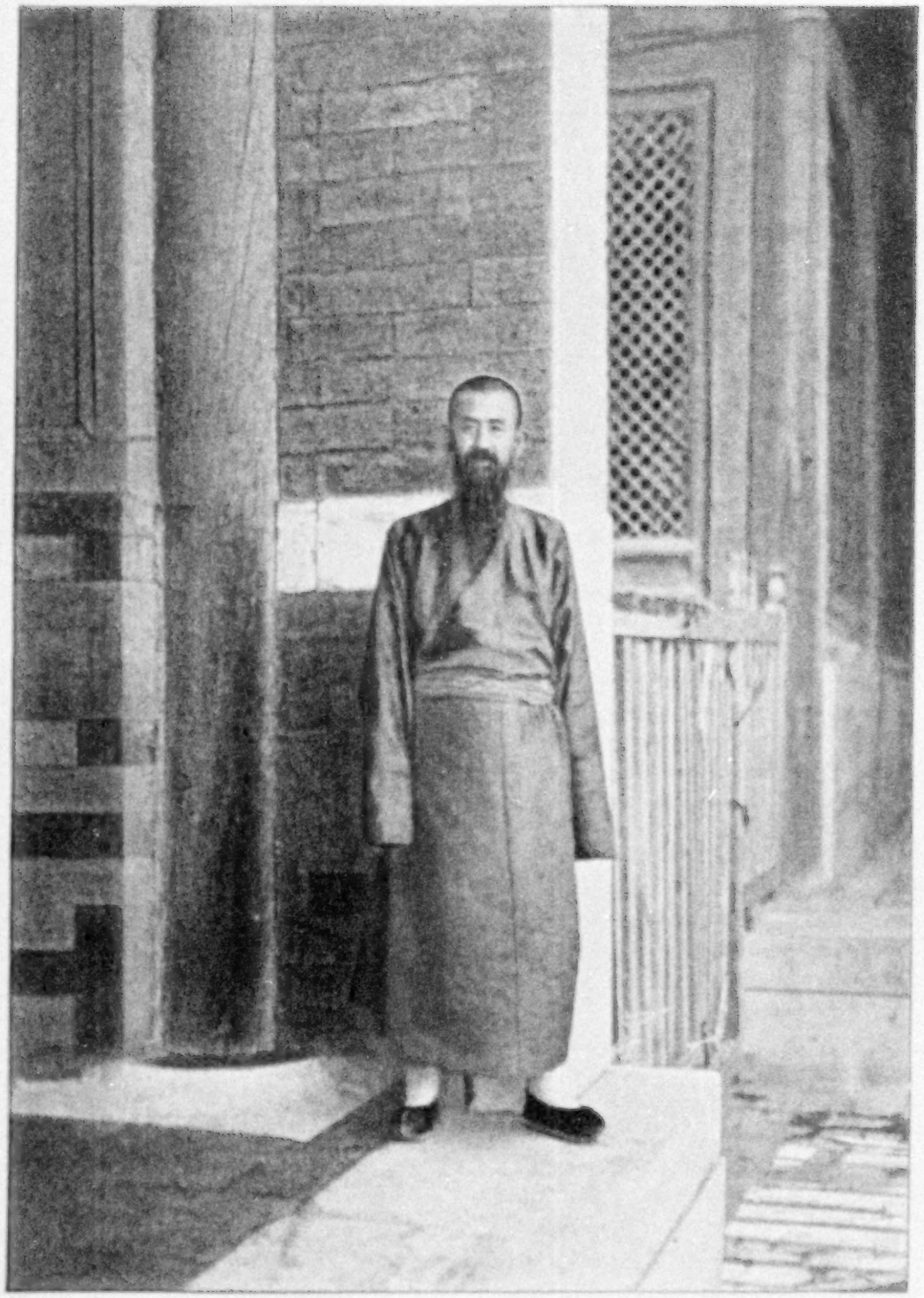
A LAMA OFFICIAL WEARING A CAPE INTRODUCED INTO MONGOLIA BY FRENCH MISSIONARIES



Autochromes by M. Stéphane Passet

A GATEWAY OF KÜFU, THE VILLAGE WHERE CHINA'S GREATEST TEACHER, CONFUCIUS, WAS BORN

A MONGOLIAN SHRINE ON THE OUTSKIRTS OF THE CITY OF URGA



Autochromes by M. Stepoane Passet

A LAMA SERVANT OF URGA, THE HOLY CITY OF THE MONGOLS

A JAPANESE FLOWER GARDEN IN PEKING

Autochromes by M. Stéphane Passet

GUARDIAN GODS IN THE SUMMER PALACE NEAR PEKING

A KHALKA WOMAN OF NORTHERN MONGOLIA

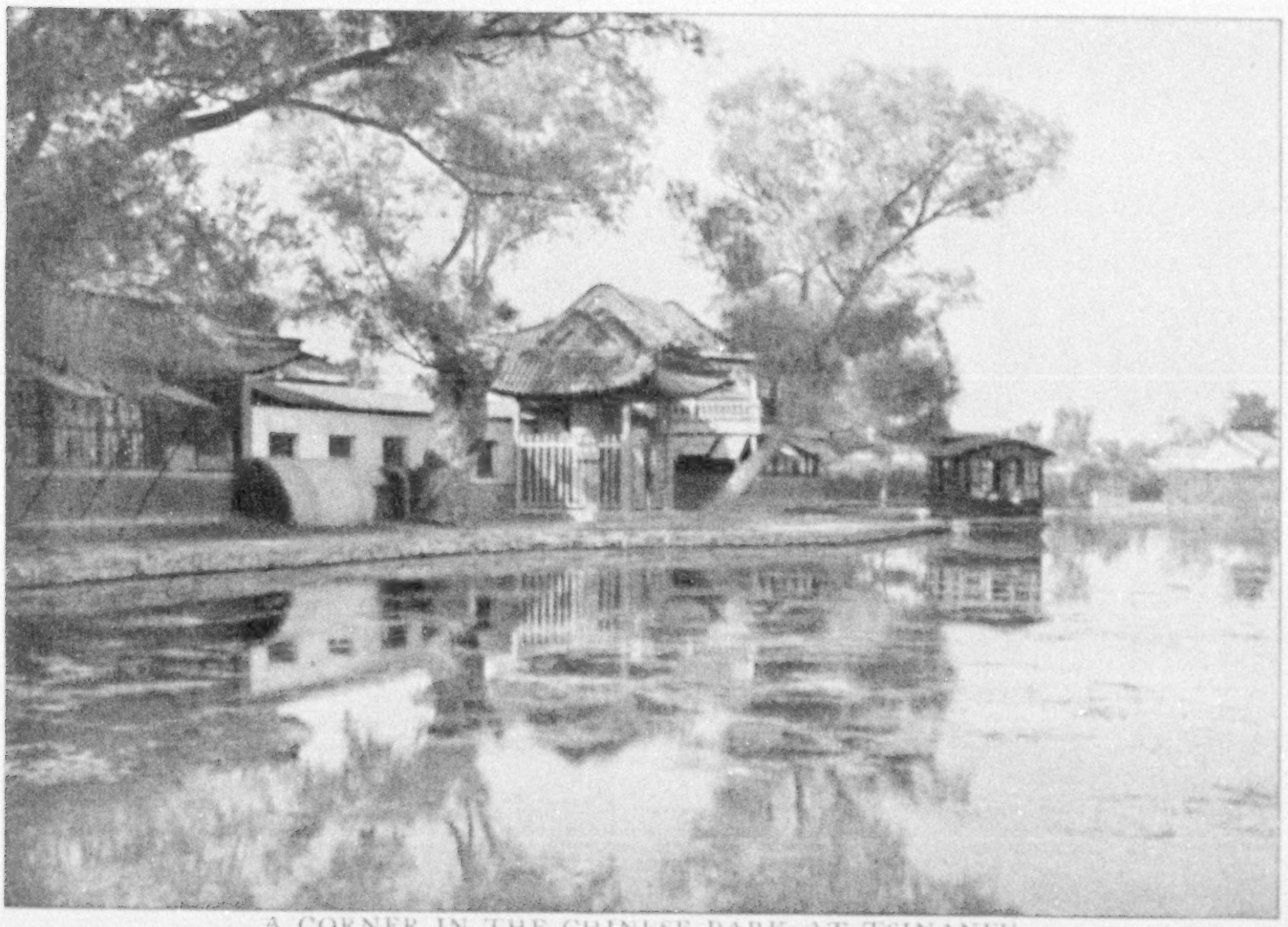
Autochromes by M. Stephane Passet

A GRAND LAMA'S MINISTER OF WAR AND HIS STAFF: URGA

THE UPPER PAVILION OF THE SUMMER PALACE NEAR PEKING

Autochromes by M. Stepnane Passet

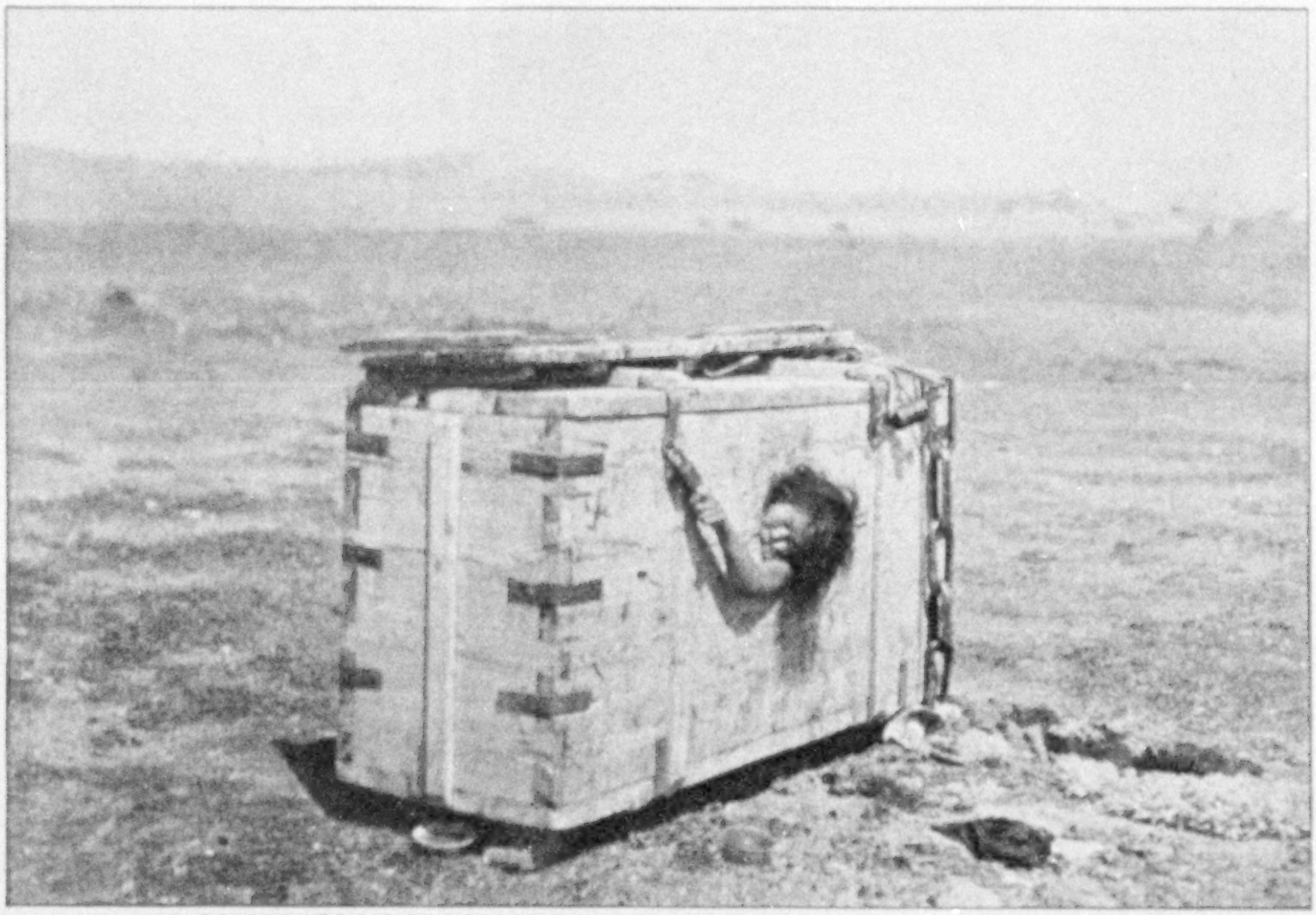
WOMEN OF PEKING, ONE OF WHOM WEARS A MANCHU HEAD-DRESS



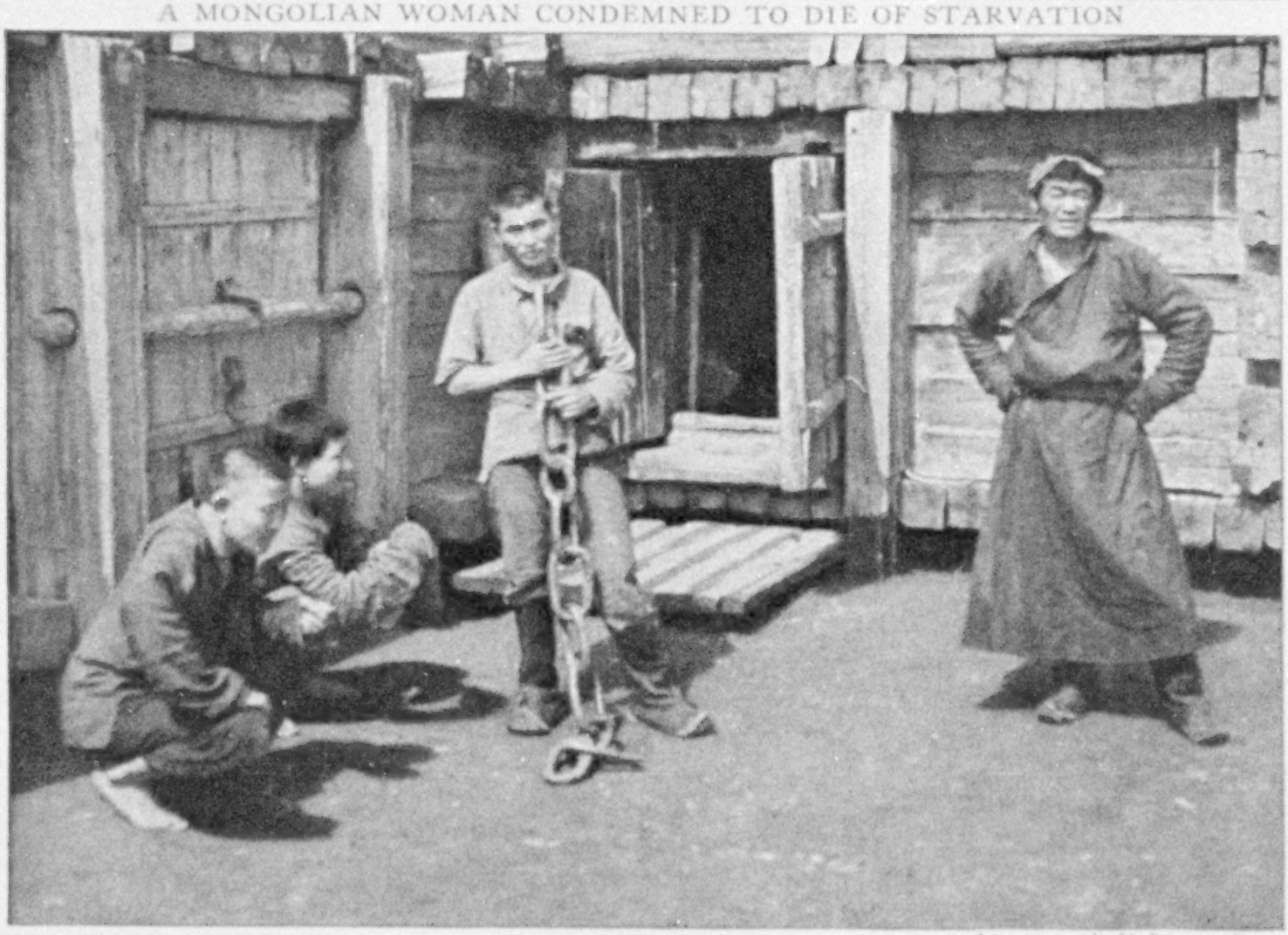
A CORNER IN THE CHINESE PARK AT TSINANFU

Autochromes by M. Stephane Passet

THE GATEWAY TO THE HALL OF CLASSICS IN PEKING



A MONGOLIAN WOMAN CONDEMNED TO DIE OF STARVATION



Autochromes by M. Stephane Passet

A LAMA IN CHAINS IN A MONGOLIAN PRISON

THROUGH THE HEART OF ENGLAND IN A CANADIAN CANOE

By R. J. Evans

WATER has always had a fascination for me, and many of my holidays have been spent camping on the waterways of England. This account deals with my most successful trip. We started from Oxford up the Oxford Canal, which, bearing due north, brought us in safety to Warwick, where we embarked upon the Avon.

Except in the immediate neighborhood of Stratford, this river is little known—a surprising fact when one remembers that for beauty of scenery and historical interest it is second only to the Thames, while, as providing a series of pictures of English country life unspoilt by modern innovations, it is the Thames' superior. The Avon we followed to Tewkesbury, where we entrained to Cricklade and started the second half of our voyage.

The Thames needs little introduction. Within the small compass of about a hundred miles it shows just what is characteristic in English scenery, history, and modern life. The monuments of the past, the placid and prosperous life of the present, the quiet pastoral beauty of meadow, woodland, and silver stream, are seen here, and all at their best.

One is inclined to say that if a visitor had only four days in which to capture a true impression of this country, he would do well to spend two of them in the Thames Valley.

THE EQUIPMENT FOR TWO IN A CANOE

Preparations for the voyage were soon made. There being only two of us to consider, a large Canadian canoe was selected as the easiest craft to work and one which possessed, in addition, the virtues of roominess and portability. A light gypsy tent was carried for camping purposes, and throughout the whole trip no trouble occurred to cast doubt upon the wisdom of our choice.

Leaving Oxford on a sunny August morning, we paddled slowly north to Banbury. The whole of this stretch is rich farming country, marked by that peaceful, settled look so characteristic of the Midlands.

The canal winds quietly through waving poppy-starred wheatfields and low-lying meadows, with the meditative cattle standing knee-deep in the sweet pasturage, while anon a bend carries one past woodlands where the trees meet overhead and form a canopy through which the sun's rays scarcely penetrate.

At intervals one comes to tiny villages, usually clustered round the old gray church, and looking, as they dream in the sunlight, the very embodiment of ease and peace.

More frequently there comes a lock, which affords a welcome break to the pleasure-boat, but which presents a formidable obstacle to commerce.

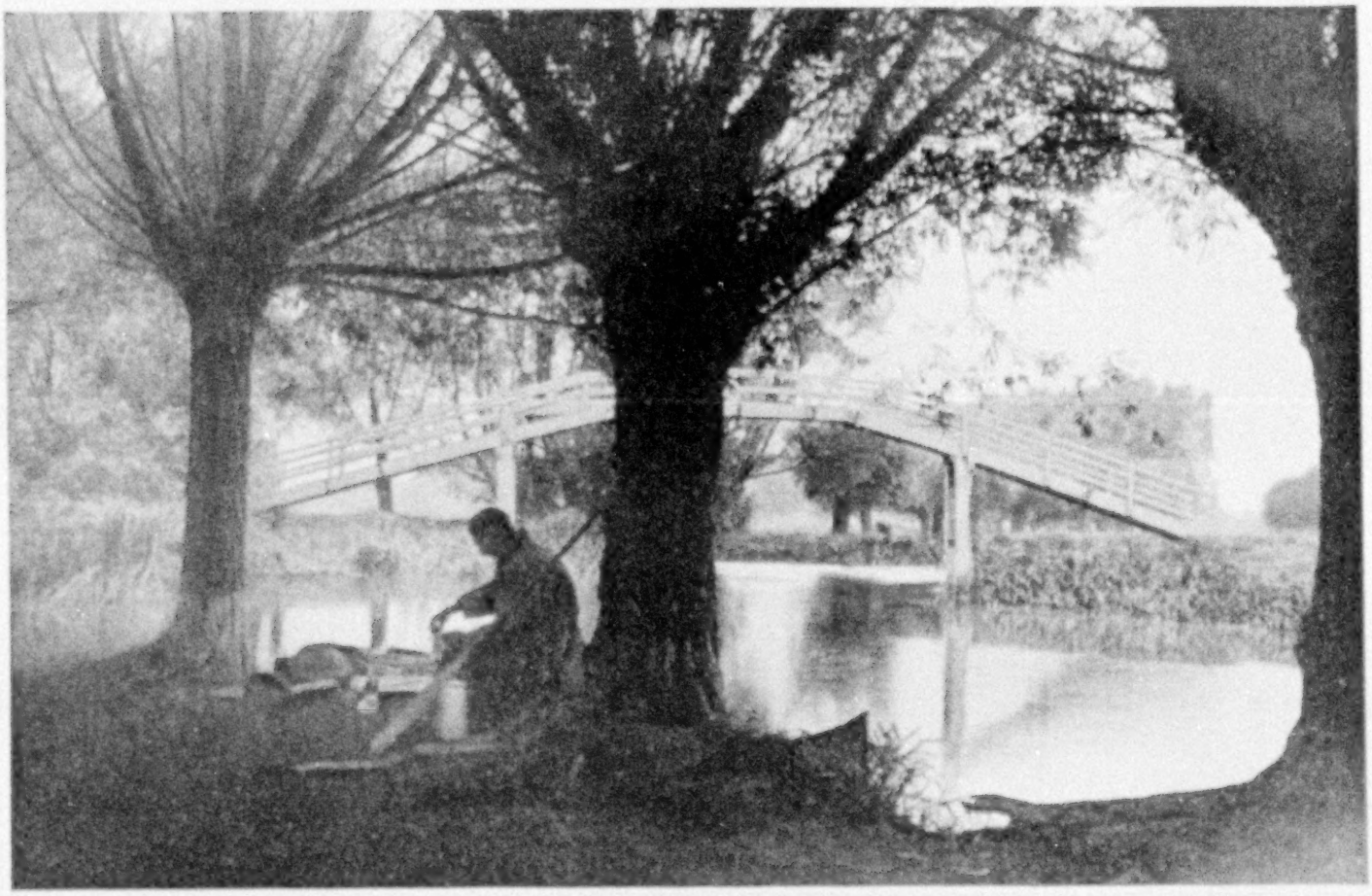
It is only sixty-five miles from Oxford to Warwick, but there are sixty-three locks, and the time spent in negotiating these is one of the chief reasons why the canals do not prosper. They are small in size, having been designed so that one man can work them, and, admitting only one barge at a time, are wasteful in the extreme, both of time and water.

BANBURY, FAMOUS FOR CAKES AND A NURSERY RHYME

Twenty-seven miles from Oxford is Banbury, famous for its cakes and its nursery rhyme of the Lady upon a White Horse. Nowadays it is a prosperous, sleepy market-town, not particularly well built, but having a few fine half-timbered houses. The Globe Room at the Reindeer Inn once had some remarkable oak paneling, but it has been acquired by an American millionaire and now decorates a mansion in New York.

Four miles farther on is the village of Cropredy, where, on June 29, 1644, a fierce battle was fought between the Royalists under Charles I and the Parliamentarians. The scene of the fight was the old bridge which spans the little river Cherwell, and which still remains much the same as it was on that summer evening 278 years ago, with the church tower

XUM



LUNCH NEAR TADPOLE BRIDGE, ON THE RIVER CHERWELL, ABOVE OXFORD

Photographs by R. J. Evans

A SCENE ON THE OXFORD CANAL NEAR LEAMINGTON

Note the low bridge, the narrow footpaths, and especially the width of water under the bridge, where the tow-path goes through.

Drawn by James M. Darley

A SKETCH MAP OF THE CANOEISTS' TRIP THROUGH THE HEART OF ENGLAND

The holiday journey began at Oxford, from which city the route lay northward on the Oxford Canal to Warwick; then in a southerly direction, on the Avon, to Tewkesbury; thence by rail to Cricklade, on the Thames, down which the travelers proceeded to London.

looking down on the triumphant Cavaliers as they pursued their foes along the road to "Puritan" Banbury.

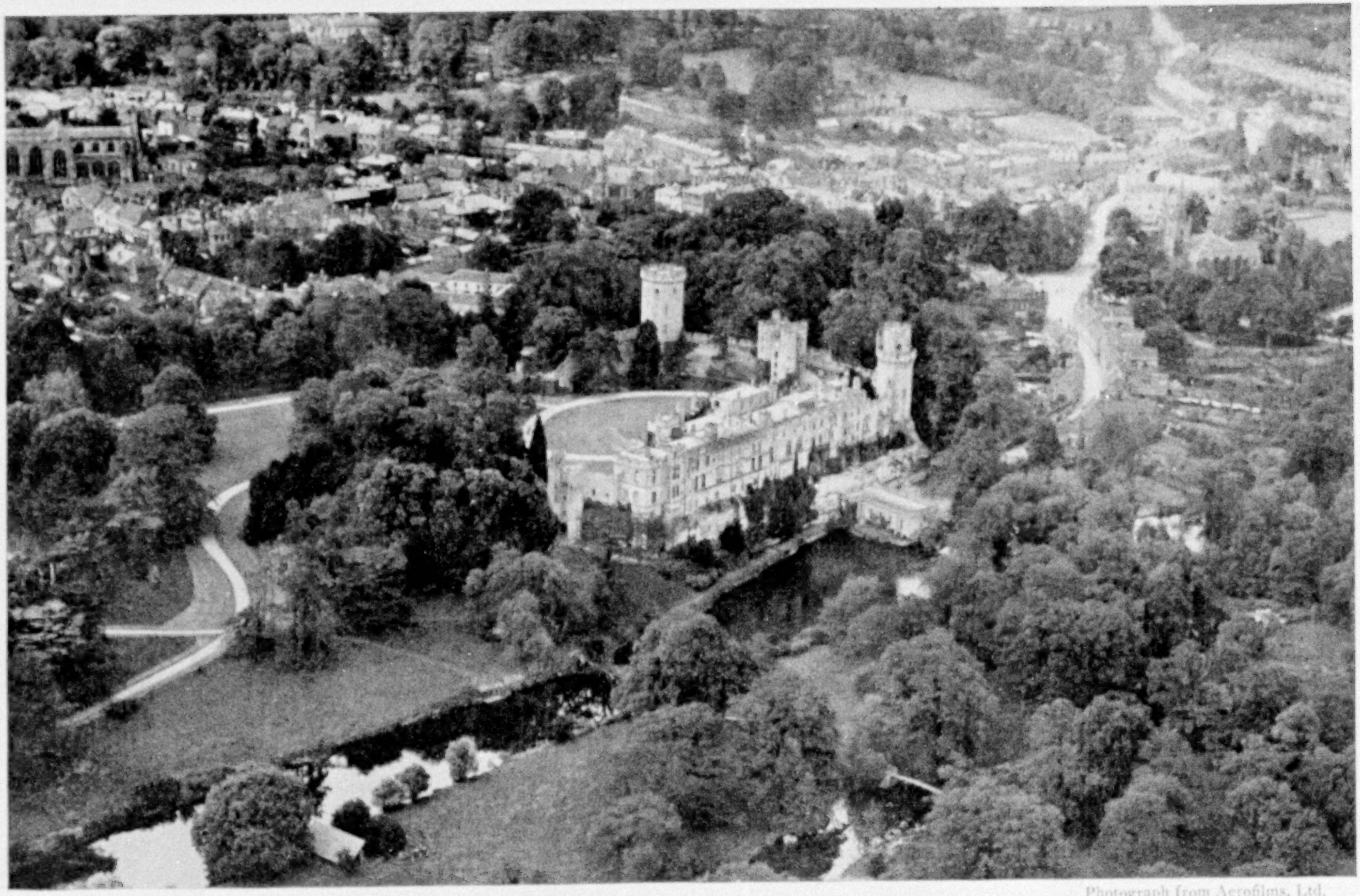
Near Cropredy we met a barge, almost the only one we had seen, though farther north they are more common. They grow fewer in number every year, and this is a great pity, for there are few more picturesque sights than a gaily painted canal-barge, towed quietly along by an old horse, with a small boy in attendance to see that he behaves, and steered by a stout old lady wearing either an old sunbonnet or a man's cap.

Life on board one of these slow-moving canal-barges appears to possess many charms. The barge people pass an amphibious existence, belonging neither to the land nor to the water, but having a human interest in each. The women almost wholly live aboard their floating homes, often never stepping ashore from one day to the other, and going about their domestic duties, as well as those connected with their calling, with all the precision and cheerfulness in the world, as if there were nothing strange or out of the way in their surroundings.

Near Fenny Compton we discovered an old windmill, one of the few of its type remaining. It is built entirely of wood, on a central pivot, so that by means of a long lever the whole structure can be swung round to suit the wind. I was reminded of a somewhat similar mill in Hampshire made from the timbers of the *Shannon*, in which one may still see the scars made by the *Chesapeake's* cannon-shot.

For the next few miles the canal runs in a cutting, and locks are so numerous (23 in 14 miles) as to become a burden; so that it was with relief that we paddled hastily through the outskirts of Leamington and embarked upon the Avon about three-quarters of a mile above Warwick.

The Oxford Canal is typical of its kind and fully illustrates the defects of the English canal system. The canals are



Photograph from Aerofilms, Ltd.

WARWICK CASTLE, THE HOME OF "THE LAST OF THE BARONS"

One of the most beautiful river reaches in England is that on the Avon where it glides slowly past the thickly wooded eminence on which stands the castle of "The King Maker." One needs little imagination to make this battlemented pile remind him of the "days of old, when knights were bold and barons held their sway."

too narrow and too shallow, being rarely more than 30 feet wide and 4 feet deep, while the largest locks are less than 8 feet in width. The locks are too numerous and too cumbrous and slow in operation, and the whole method of horse-barge transport far too slow.

To bring the canals in line with modern requirements would be enormously expensive, and so it is probable that they will remain as they are—the picturesque and extremely interesting survivals of a more leisurely age.

WARWICK, ONE OF ENGLAND'S MOST INTERESTING TOWNS

Warwick is one of the most interesting towns in England, its history going back more than a thousand years, to the foundation of the castle by Ethelfleda, the famous daughter of King Alfred.

The present building dates from the 13th century and is one of the stateliest of England's homes. Rising from the very bank of the Avon, with its great Norman keep towering aloft like a giant sentinel, it presents a picture of dignity and strength which remains long in the memory (see pages 476 and 478).

The town itself is full of medieval associations. In the center of the High Street is the Leycester Hospital and Chapel, where twelve old soldiers pass the evening of their days, living under the rules laid down by their 16th-century founder and forming a striking instance of that continuity of tradition and dislike of change so characteristic of the Midland folk.

The Church of St. Mary has, alas, been "restored," but the wonderful Beauchamp Chapel remains untouched. Built between 1400 and 1500, by the great Beauchamp family, at the height of the Perpendicular period, it is an architectual gem and forms indeed a page of English history in itself (see page 479).

THE CHARM OF ENGLISH PARK-LAND

From Warwick the Avon winds away toward Stratford through the grounds of the castle, and there we realized to the full the extraordinary charm of the English park-land.

The low-lying fields, covered with the lush green grass and dotted with the golden buttercups and snow-white daisies, stretch away on either side, broken by the trees, singly, in clumps, or great masses, which are the glory of the place. Here is a group of oaks which were saplings when the Armada sailed, and there a giant beech raises its clean, velvet-smooth trunk.

Herds of deer move lazily and securely along, while from all around come the calls of innumerable wild-fowl. A noble heron flapping slowly overhead and the great castle in the background complete the picture. It is a very "haunt of ancient peace."

On leaving the park our course became more difficult, and great care was necessary to avoid the shallows and rocks which plentifully bestrewed the river-bed. Fortunately, no mishap occurred, and by nightfall we were safely encamped at Stratford, the home of Shakespeare.

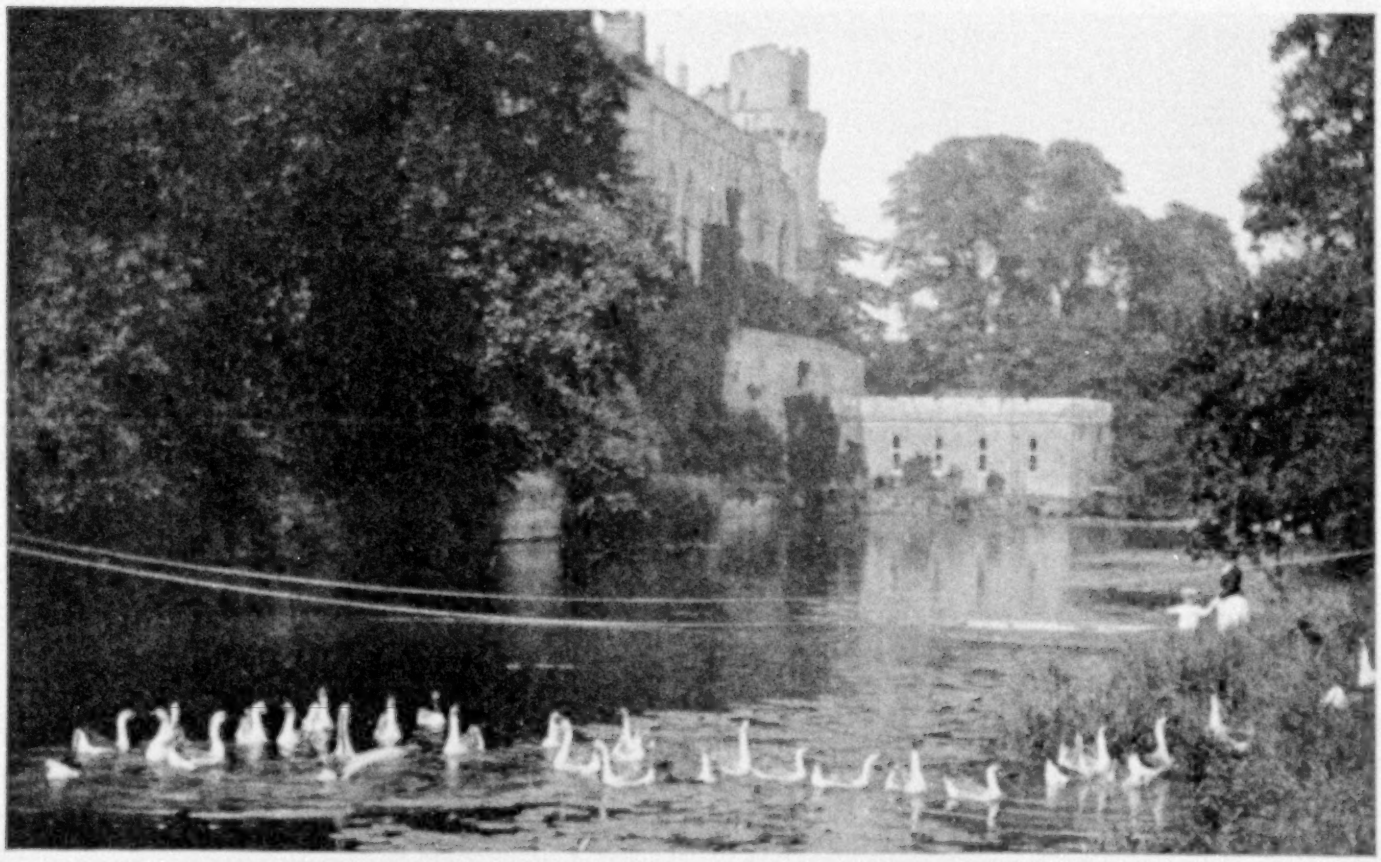
STRATFORD DURING A SHAKESPEARE FESTIVAL

We were lucky enough to arrive during the annual Shakespeare festival and found the town crowded with visitors. Is there any significance in the fact that by far the greater number hailed from America? Certainly, he who wishes to understand the English people and the things which have gone to make them must visit Stratford; and we counted it a happy augury to see the two great branches of the English-speaking peoples meeting here in common homage to the greatest of English-speaking writers.

The whole town and neighborhood is given up to the cult of Shakespeare, and this is as it should be. Shakespeare is England's poet, and Stratford is a typical English town, set in the heart of England.

We first climbed the tower of the Memorial Theater (see page 481) and looked around. The Avon flows gently past the very foot of the building, and close by is crossed by the two ancient bridges, with their many arches, while in the distance is the smiling Midland plain.

The town itself is like many English country towns — quiet, dignified, and peaceful. Shakespeare's house lies in a by-street. With its gables, small diamond-paned windows, and framing of oak beams, it is typical of the 16th-century middle-class house.



Photograph by Charles Reid

SWANS ON THE AVON, BENEATH THE BATTLEMENTS OF WARWICK CASTLE

To sense the glory of the past, one should leave the convenient railways of England and float on the quiet rivers of the land. Such weathering walls of huge, silent castles stand as mute memorials to a rich history, festooned with epoch-making events.

Photograph by R. J. Evans

ALWAYS THE FIRST JOB OF THE DAY, THE OUTDOOR SHAVE

The equipment for this novel 250-mile trip through the most historic region of England consisted of a large Canadian canoe, a gypsy tent, collapsible canvas basin (seen in the illustration), and a few cooking implements.

Photograph from "Topical," © Central Aerophoto Co., Ltd.

KENILWORTH CASTLE, WHICH CROMWELL'S MEN DESTROYED

Founded by Geoffry de Clinton about 1120 and distinguished by its Cæsar's tower, or Norman keep, with walls 16 feet thick, Kenilworth Castle, five miles north of Warwick, lives in romance because of the events enacted there in the days of Queen Elizabeth.

Photograph by R. J. Evans

LEYCESTER HOSPITAL AND CHAPEL, HIGH STREET, WARWICK

The road goes under the chapel through the arch; the hospital is the old building on the right. The chapel entrance is at the far end, up the steps and along the parapet over the arch, under the flying buttresses—a curious idea.

Photograph by Douglas J. McNeille

A STATELY AVENUE OF TREES MARKS THE APPROACH TO THE CHURCH WHERE SHAKESPEARE LIES BURIED

Holy Trinity Church, Stratford-on-Avon, is the foremost literary shrine of the English-speaking world, and no American visitor to Shakespeare's birth-place fails to read the inscription on the gravestone beginning, GOOD FREND FOR IESVS' SAKE FORBEARE.

In the High Street is the old Grammar School where the poet learnt his "little Latin and less Greek," and which still, in its quaint, low-ceilinged rooms, with their heavy oaken beams, carries on the tradition of learning. A little farther on is New Place, where Shakespeare spent his last years, but which is now a garden.

Near by, in a still green close, approached by an avenue of shady limes, is the church where the poet lies buried, surrounded by his kinsfolk (see page 480).

Photograph by R. J. Evans

SHAKESPEARE MEMORIAL THEATER, STRATFORD

Shakespeare's plays are performed here annually during April and August. The statue in front is of the poet. The building is modern, having been erected in 1877.

SHOTTERY, THE HOME OF ANNE HATHAWAY

The next morning we walked over to the little village of Shottery, half buried in the trees, a mile and a half away. Here is the home of Shakespeare's wife, Anne Hathaway. With its half-timbered walls and thatched roof, broken by the deep-set dormer windows and surmounted by sturdy, honest-looking chimneys, it is the perfect cottage (see page 482).

Returning down the High Street, we visited and photographed the Harvard house, home of the founder of Harvard University and a mecca for American pilgrims.

We stayed four days in Stratford and left with regret.

Formerly the Avon was an important waterway, and vessels of forty or fifty tons berthed regularly at the wharves of Stratford, but, as in many other cases, the railway killed its prosperity; and now the river, no longer looked after, is slipping back to its unimproved condition.

Some of the locks and weirs have been partially removed, and shallows, terminating in awkward and sometimes dangerous obstructions, have thus been created. We were frequently hindered also by the weeds and rushes, which in places stretch from bank to bank. Bent on pleasure, as we were, and with plenty of time, these difficulties added to our enjoyment.

The twenty-mile stretch to Evesham is full of interest. There are no towns and few villages. The prevailing impression was one of remoteness, which was added to by the obstacles we had to surmount. It was hard to believe that within a few

Photograph by W. A. Mansell and Co.

ANNE HATHAWAY'S THATCHED-ROOF COTTAGE: STRATFORD-ON-AVON

For more than three centuries the world has speculated upon the love scenes which were enacted in this cottage, where the creator of Romeo and Juliet, of Miranda and Ferdinand, of Beatrice and Benedick, of Bassanio and Portia, of Rosalind and Orlando, won his bride.

miles were manufacturing towns, full of busy people. Here everything betokened peace and the absence of man.

EVESHAM, WHERE SIMON DE MONTFORT FELL

Evesham has a fine position in a loop of the river, and is specially famous for its orchards. Lying in a sheltered district called the "Golden Valley," its fruit rivals that of Kent, and in springtime the miles and miles of pink and white blossoms, filling the air with their fragrance, make a sight not easily forgotten.

Historically it is the scene of the decisive battle in which the great popular leader, Simon de Montfort, the first man to summon a representative Parliament in England, was killed, on August 4, 1265. The victor was Prince Edward, afterward the great warrior-statesman, Edward I, who, as he himself said, learnt much from the career of his rival.

Montfort's words before the battle are immortal. Seeing the Prince's army descending the hill, and so trapping him in the river bend, he turned to his son with the remark, "Let us commend our souls to God, for our bodies are Prince Edward's." So perished a gallant gentleman.

The town itself is disappointing. There are two churches sharing one churchyard; but they have been "restored," and so robbed of much of their interest. Near by is the Bell Tower, a beautiful Perpendicular structure standing quite alone, an unusual feature in England, and forming a landmark for miles around.

CANAL LOCKS PROVE A TRIAL

Below Evesham the river widens, but still keeps its air of quietness. We paddled down reach after reach, all invested with the same spirit of remoteness from man and his doings and all beautiful with the beauty of English meadowland and woods.

The locks, which below Evesham have not been taken away, taxed our ingenuity and patience very highly. At Chadbury, after a specially vigorous struggle, we were told by a contemplative old man, who watched us with great interest and amusement, that that particular lock had not been opened for two years, but that it was much better than the next one, at Fladbury (see page 484).

He was right. Fladbury was our Waterloo. By great efforts we succeeded in shutting the bottom gates and opening one of the sluices; but the lock then refused to fill, owing to the numerous leaks; so that, after all, we were compelled to portage the canoe to a spot nearly half a mile below.

This done, we soon arrived at Pershore, where we spent a few hours exploring the little town, which on the hot summer afternoon seemed wrapped in slumber, before tackling Pershore lock. Fortunately, this was in comparatively good condition, so that we managed to push on to Tewkesbury without much delay.

The last few miles were through monotonous country, though we might have seen more beauty in it if there had not been a strong head wind which taxed our temper and delayed our progress.

WHERE RICHARD CROOKBACK SLEW THE LANCASTRIAN PRINCE

Tewkesbury stands at the junction of the Avon and Severn, and so has always been an important route town. The greatest day in its history was May 4, 1471, when, at Bloody Meadow, between the two rivers, the Yorkist King Edward IV defeated the Lancastrians under Queen Margaret and her son Edward, both of whom were captured.

Tradition points out the spot on the old Avon bridge near by on which Richard Crookback, brother of the king, slew the Lancastrian prince in cold blood after the battle.

The town itself has many interesting old houses, including the Hop Pole Inn, at which Mr. Pickwick dined on his memorable journey from Bristol to Birmingham, in company with Mr. Ben Allen and Mr. Bob Sawyer.

The old Norman Abbey Church is one of the stateliest buildings in the West Country, and contains the tombs of many great men, including that of George, Duke of Clarence, who, condemned to death for high treason, was allowed to choose the form his end should take, and, in accordance with his choice, was drowned in a butt of malmsey wine—or so tradition says.

FLADBURY LOCK, ON THE AVON, TYPICAL OF THE LITTLE USED WATERWAY

This lock would not fill, so the author and his companion had to portage their canoe nearly three-quarters of a mile. Note the bushes growing out of the gate itself.

Photographs by R. J. Evans

FLEET INN, ON THE AVON NEAR TEWKESBURY

Notice the ferry, with its gates at either end to prevent animals breaking overboard if alarmed. Edward, Prince of Wales, slain by the Yorkists in 1471, is buried in the magnificent abbey church near by, one of the finest specimens of early Norman architecture in England.

THE THAMES ABOVE LECHLADE, NEGLECTED DURING THE WORLD WAR

In many places the weeds are so thick as to make progress in a canoe almost impossible (see text, page 486).

Photographs by R. J. Evans

DESCENDING HARRINGTON WEIR

Formerly there was a lock here, but it has been taken out and only the sill remains, over which the canoe has to be carefully lowered. Note the pavement in the foreground. The place is now used as a ford.

Photograph by R. J. Evans

THE MARKET PLACE IN LECHLADE

The church was a great favorite of the poet Shelley, who wrote a poem about its spire. The wide street and houses of stone are characteristic of the district.

At Tewkesbury we left the water and journeyed by train to Cricklade, a little town some seven miles from the source of the Thames.

At Cricklade the river is little more than a rivulet—in fact, the local people all referred to it as "the Brook," and that the name was well deserved we found from personal experience.

The first eleven miles to Lechlade is not really navigable water, and for most of the distance we had to walk in the bed of the stream, guiding the canoe over the shallows, which occurred every few yards, while if there were sufficient depth of water our progress was impeded by the heavy weeds, which, thanks to enforced neglect during the war, were a formidable obstacle.

At Lechlade the river becomes navigable, though from here to Oxford traffic is scanty, and it is rare to see anything larger than a rowboat (see page 485).

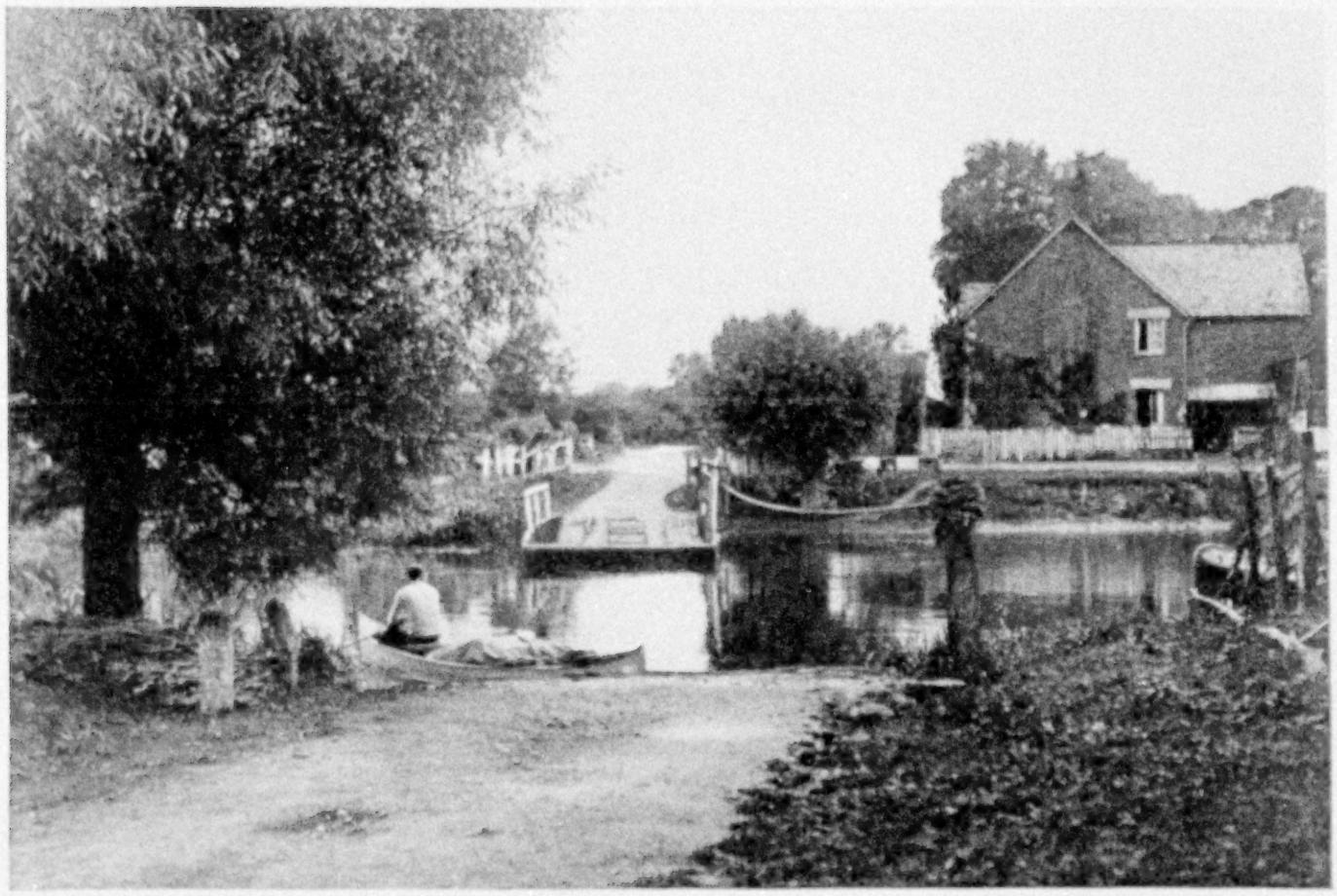
The river winds its narrow, tortuous course between long, level meadows or rushy banks. Black and dun cattle wading in the shallows; an old bridge or a comfortable riverside inn haunted by anglers, for the river here is full of fish; a heron winging his slow way home—these are the most exciting scenes in a day's paddle. But though this country is not on the grand scale, it has a quiet beauty all its own, which is remembered when more spectacular places are forgotten.

IN LECHLADE, WHOSE CHURCH SPIRE SHELLEY MADE FAMOUS

Lechlade is a Cotswold town, built round the wide and sunny market-place, from one side of which rises the 16th-century church, with its spire so loved by the poet Shelley (see page 486). The houses are of stone, brick being a rarity in the Cotswolds, and have an air of mingled spaciousness and dignity which is most attractive.

A steady, uneventful paddle of fifteen miles brought us to Newbridge, which, like New College at Oxford and the New Forest, is of great antiquity, being in fact the oldest bridge on the river.

On the bank is the old inn bearing the quaint sign of "The Rose Revived." Its



Photograph by R. J. Evans

THE FERRY AT BABLOCKHYTHE HAS ITS PLACE IN ENGLISH POETRY

This picturesque spot is mentioned in Matthew Arnold's "Gipsy Scholar." Note the rope by which the ferry is operated.

sign-board was painted by Sir Hamo Thorneycroft, and represents a rose in a glass of beer, in which liquid it appears to be flourishing greatly. Over the sign-board is a small penthouse to act as a defense against the weather.

PASSING THE SCENE OF THE "KENILWORTH" TRAGEDY

Four miles below is the ferry (see above) where Matthew Arnold saw the Scholar-Gipsy "crossing the stripling Thames at Bablockhythe," and about a mile on the right the village of Cumnor, where was enacted the tragedy of Amy Robsart, described by Sir Walter Scott in "Kenilworth."

At this point we could see Oxford, but as the river describes a great horseshoe curve, it was some time before we approached the outskirts of the city. The sordid nature of the last two miles, covered with railways, warehouses, and gasometers, is only equaled by the memory of its departed glories.

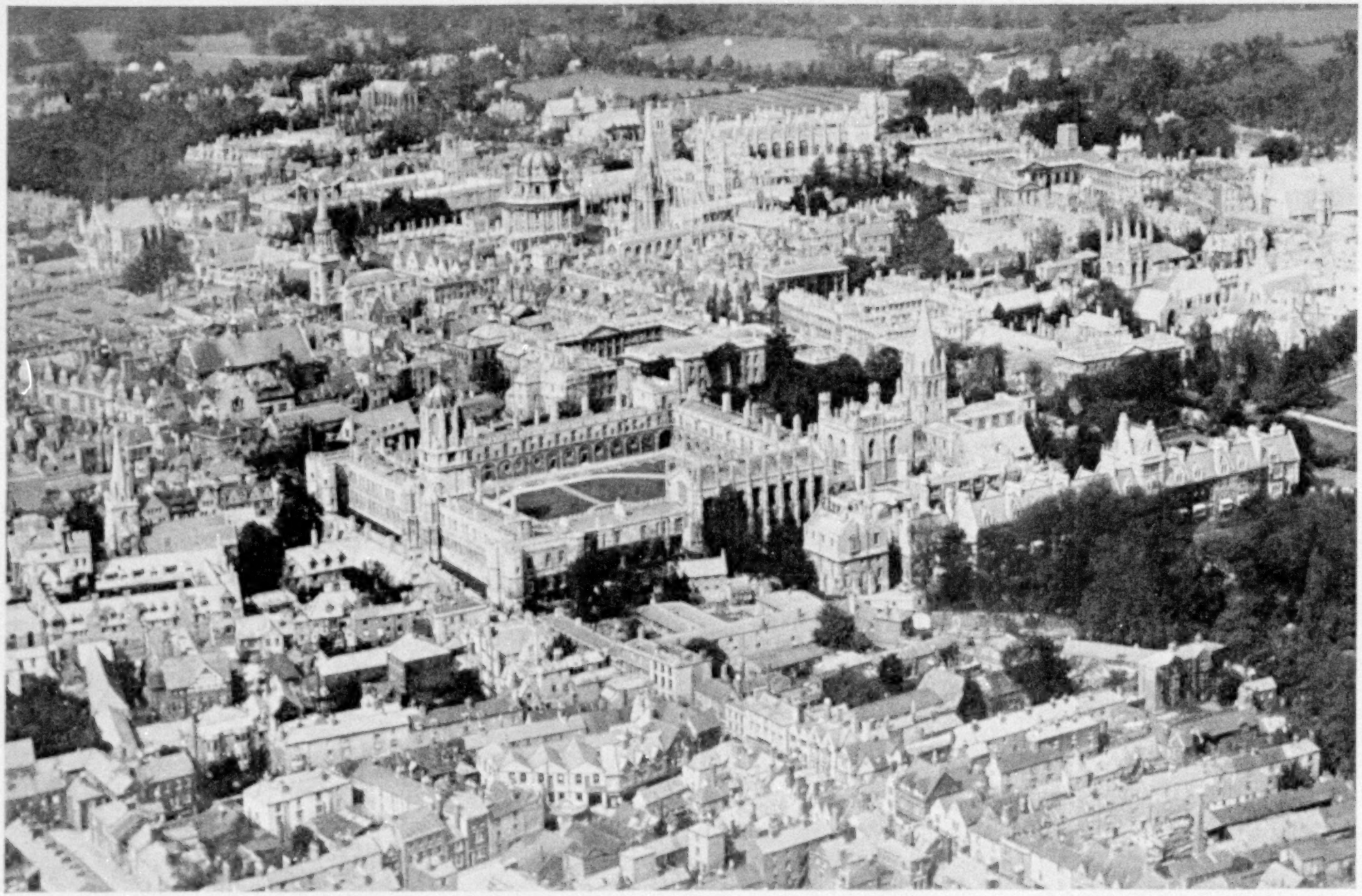
On the left, where now is a cemetery, stood the great Abbey of Osney, and just below the old keep of Oxford Castle rears its hoary head from among the hideous litter and lumber of a gas-works and a railway; yet it was the scene of one of the most romantic adventures of the Middle Ages.

In the year 1142 King Stephen was besieging the castle, in which was his rival, Matilda. A frost set in, followed by a heavy snowstorm, and the case of the garrison was desperate. But Matilda was a true Plantagenet. With four chosen knights, dressed all in white, she stole out of a little postern gate, and under cover of darkness fled across the frozen river and over the snows to Abingdon, seven long miles away, where help awaited her.

A little farther on the river divides and passes under the old Grand Pont, or Folly Bridge, the center of Oxford's aquatic life.

OXFORD A TOWN THAT BELONGS TO THE WORLD

Oxford is one of those towns which, like Rome, Prague, and a few others, are



Photograph from "Topical." © Central Aerophoto Co., Ltd.

OXFORD, WHERE DOMES AND TOWERS BESPEAK THE POWER OF THOUGHT

In the center of the picture is the Tom Quad, surrounded by the buildings of Christ Church College, with the cathedral to the right. In the distance is New College, one of the oldest buildings in Oxford. The dome of the Radcliffe Camera, which formerly housed the library, is a favorite place for a view of the maze of buildings which education has erected in England's most famous university town.

XUM

Photograph from "Topical," © Central Aerophoto Co., Ltd.

HENLEY-ON-THAMES ON REGATTA DAY

Henley is an unimportant market town, beautifully situated at the foot of the Chiltern Hills, and has a famous grammar school more than three centuries old. It is becoming a fashionable summer resort, but its main claim to fame is that it has taken "regatta," which once applied to gondola races in Venice, and made it its own; so that boating men the world over think of a small English town, rather than the Queen City of the Adriatic, when the word is mentioned. The famous rowing event takes place early in July of each year (see text, page 495).

Photograph by R. J. Evans

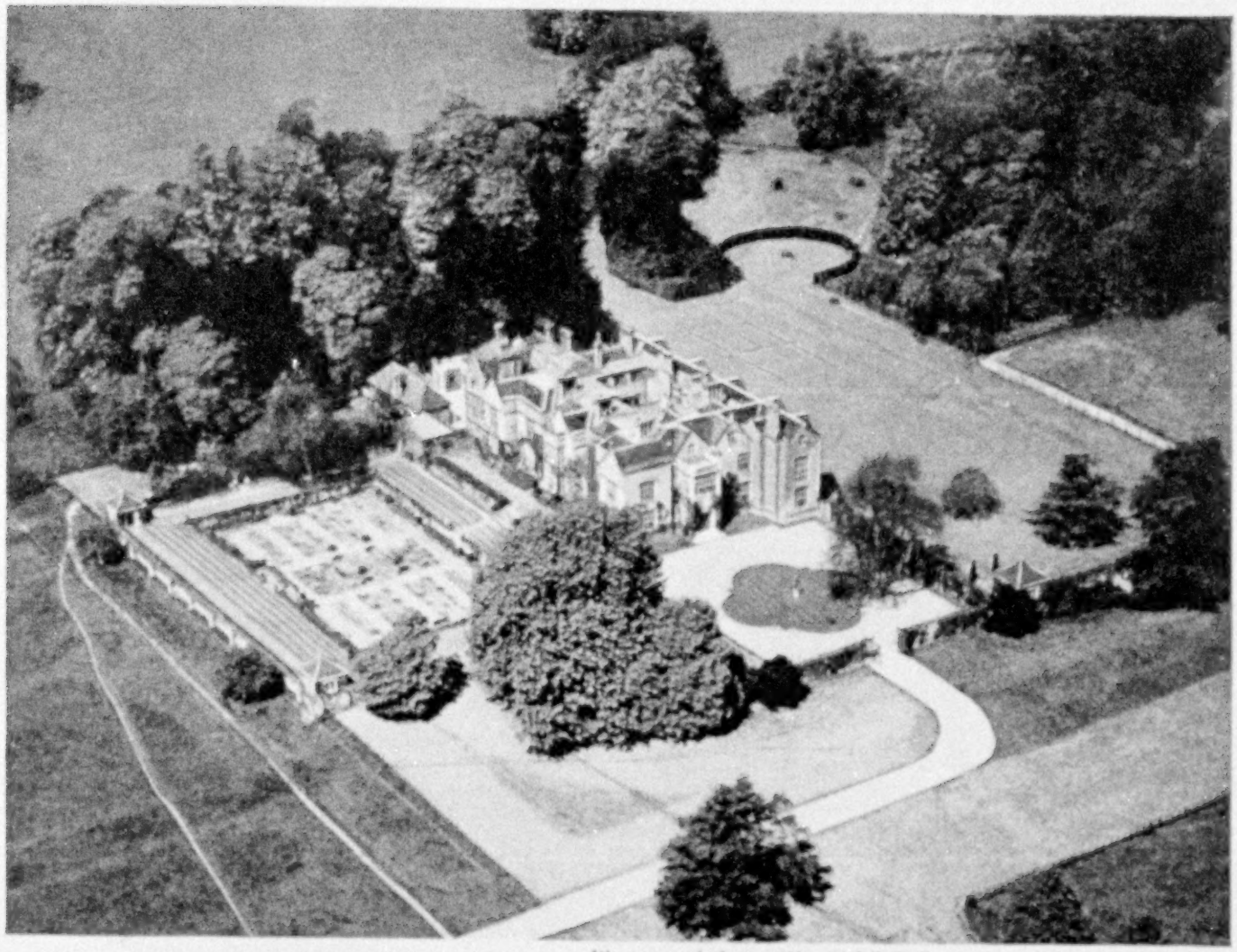
PANGBOURNE, A TYPICAL THAMES-SIDE PLEASURE RESORT

The photograph was taken from the lock to which the white posts guide the voyagers at night.

Photograph by Judges, Ltd., courtesy of C. A. Tinker

A QUIET STRETCH OF THE THAMES AT ABINGDON

The most charming section of the Thames lies between Oxford and Windsor. Here the placid waters reflect the fine Early English tower of the Church of St. Helen.



Photograph from "Topical," © Central Aerophoto Co., Ltd.

WHERE PREMIER LLOYD GEORGE SPENDS HIS WEEK-ENDS

An airplane view of "Chequers' Court," Buckinghamshire, in the heart of England.

really the property of the world, rather than of a single nation. It is impossible in so short an article to give more than a cursory glance at its many beauties. It should be remembered that, with Cambridge, it is the only example remaining of a university with a tradition of communal living in colleges, independent of the university organization, which goes back hundreds of years (see page 488).

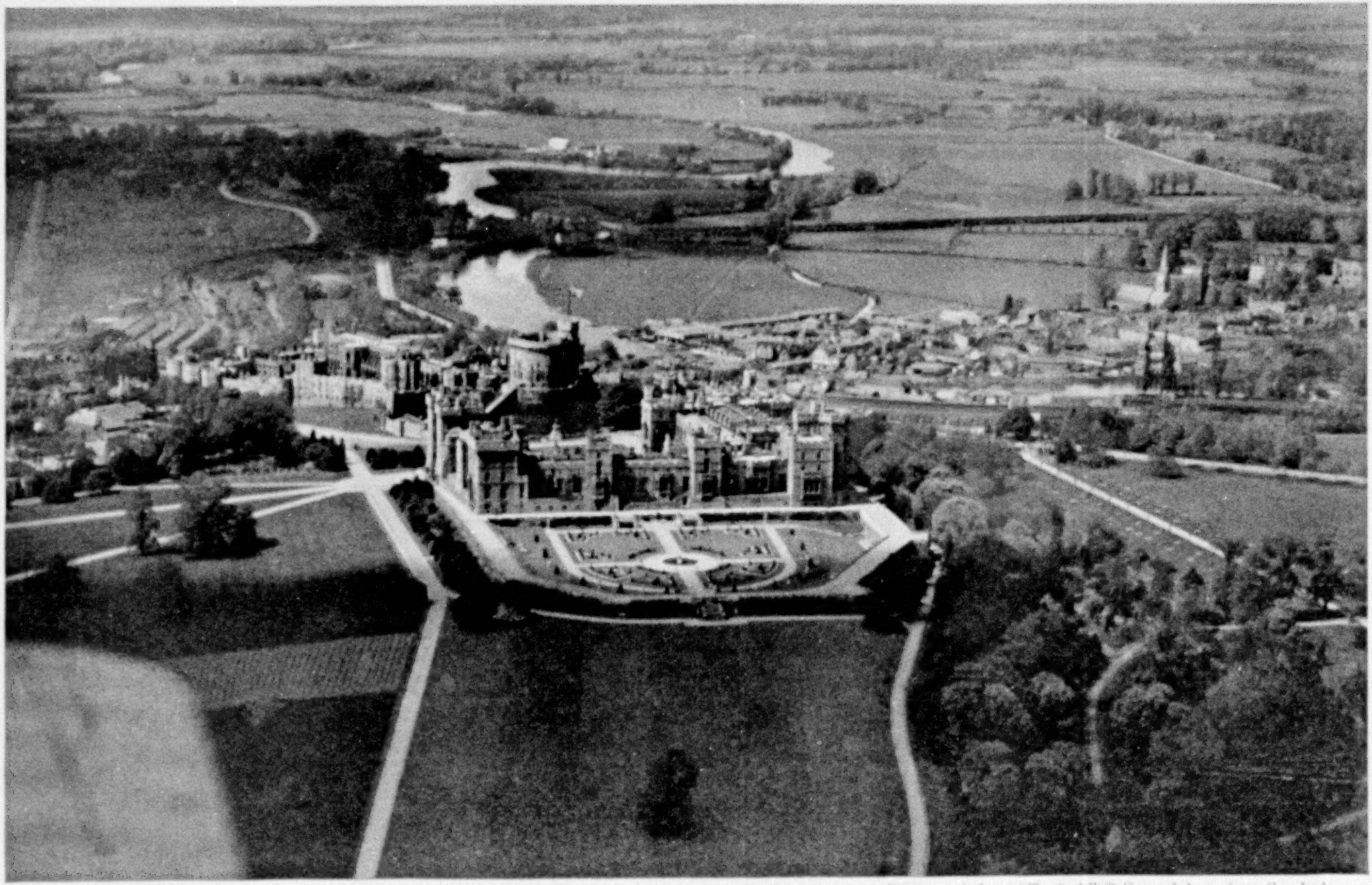
The city is a living link with whatever is or has been best in English life through the ages, and forms in itself an epitome of English social and national history.

Even the most hurried glance at the portraits lining the college dining halls will show the truth of this statement. From Wycliffe and Wolsey to Cecil Rhodes, there is an unbroken line of philosophers and poets, warriors and statesmen. Small wonder that Lord Macaulay picked out the High Street of Oxford and the Close at Salisbury as the two places in Britain through which a Briton would most hate to see enemy soldiers marching.

The "High" is a noble street, some say the noblest in the world. And Oxford has much to offer which is little inferior.

There is the view from Carfax down St. Aldates to the tower of Christ Church, where Great Tom still strikes, at 9 p. m., his 101 strokes, the number of undergraduates, as ordained by the founder of the original college, Cardinal Wolsey. Or climb the Radcliffe Camera and look at the city lying outspread, with the noble tower of Magdalen away in the distance.

Every college has some peculiar attraction and tradition of its own—the library at Merton, with its chained books; the old city walls in New College garden; the chapel of Christ Church, which is also a cathedral—a unique distinction; the sun-dial at Oriel. The list is endless and months might be spent exploring and



Photograph from "Topical," © Central Aerophoto Co., Ltd.

WINDSOR CASTLE, QUEEN VICTORIA'S FAVORITE HOME BESIDE THE THAMES

Purchased by William the Conqueror from the monks of Westminster Abbey, the site on which Windsor Castle now stands has been built upon by many successive rulers. From the Round Tower, which was used as a prison until 1660, there is a wonderful view of the well-ordered countryside, with Eton College just across the Thames. This view shows the Private Apartments as seen across the East Terrace Garden from the air.

appreciating the stored riches of the ages. In this bustling 20th century it is a relief to come to the gray old city and rest awhile among its dreaming spires.

WHERE OXFORD'S BUMPING RACES ARE HELD

From Oxford the river runs to Iffley, a little village two miles below. This stretch is the scene of the College bumping races—the Torpids in the Lent term and the Eights in the summer term. Both are eight-oared races, extending over a week, the boats starting in a line-ahead formation, 150 feet apart.

In both sets of races the principle is that each boat endeavors to overtake and touch the one in front, and if successful takes its place on the succeeding day. Few sights are more beautiful than this—the crowd of undergraduates running on the tow-path, the long string of racing boats, and the line of boats and barges crowded with bright blazers and pretty dresses.

Iffley Mill is probably the most photographed place on the Thames; and, with its mellow red roof guarded by the tall poplars, it is worth picturing.

Two miles below is Sandford, where from time immemorial the King's Arms has been the goal of undergraduate boating parties. Getting through Sandford lock, we paddled on to Abingdon past the Nuneham woods, which in places here come down to the water's edge. Unfortunately, for most of the distance the banks are too high for a small boat to command an extensive view.

Abingdon has fallen from its high estate. In bygone days the abbots of Abingdon dominated the whole district; but their monastery vanished at the Reformation, and not even the site of it is now known.

We found little in the town to detain us, and, paddling down a fine sailing reach, turned down a backwater to the little village of Sutton Courtenay, consisting of a long row of old English cottages, a village green, and a fine avenue of trees—a perfect specimen of the small hamlets which sleep by the banks of Father Thames.

A mile below we reached Clifton Hampden and pitched our camp in the gardens of the "Barley Mow," an old thatched inn and one of the quaintest on the river. Its low-pitched roof, beamed walls, and latticed windows give it a really story-book appearance, and inside the impression of unreality is intensified.

Leaving Clifton Hampden after a good night's rest, we soon reached Day's Lock, sheltered by the twin hills of Sinodun, each with a group of trees at the top, known locally as Wittenham Clumps, one of the best-known landmarks for miles around.

A mile away on the left is Dorchester, another instance of fallen greatness. In the seventh century it was the scene of the baptism of Cynegil, the first West Saxon king to become a Christian, and in the tenth century it was the see of an enormous diocese which stretched to the Humber. In later years the Austin friars built a great priory here, of which the abbey church remains as one of the chief glories of the river. Dorchester has vanished from history for 800 years, but it remains a village of singular peace and charm.

The next few miles are somewhat lacking in interest. We paddled quietly on through Shillingford; Wallingford, a great strategic point in the Middle Ages, but now a sleepy and uninteresting town; under the Great Western Railway bridge at Moulsford, and then down a straight two-mile reach on which the Oxford University trials are rowed before the Eight to row against Cambridge are selected.

Half-way down the reach is the Beetle and Wedge Inn, an old hostelry rebuilt about fifteen years ago and having its unusual sign prominently displayed.

THE MOST BEAUTIFUL SPOT ON THE THAMES AT GORING AND STREATLEY

A mile below are the twin villages of Goring and Streatley. They occupy what was the most beautiful spot on the Thames, but now, alas, are crowded with the houses of the newly rich; and what was a paradise is now an inferno of money and motor-cars. The country round is still unspoilt and the reaches down to Pangbourne full of beauty.

Pangbourne is suffering the same fate as Goring and Streatley, but we got an effective photograph at the lock before paddling on to Reading, four miles below.

Photograph from Aerofilms, Ltd.

ETON, THE MOST FAMOUS OF THE ANCIENT PUBLIC SCHOOLS OF ENGLAND

Half-way down this stretch we passed the famous Hardwick house. Lying well back from the river, at the end of a magnificent avenue of oaks and cedars, it is one of the oldest houses in the country. Parts of it date from the 14th century, but the main building is Tudor. Queen Elizabeth stayed here and Charles I spent many hours on the old bowling green in front of the house.

READING, FAMOUS FOR ITS BISCUIT FACTORY

We did not stay long in Reading. It is obviously a creation of the railway rather than the river, and by becoming in size and wealth the first town on the river above London, it has lost the charm it once possessed.

A busy, dirty town, it is famous the world over as the seat of Messrs. Huntley & Palmer's biscuit factory and Messrs. Sutton & Sons' seed gardens; but to one who loves the Thames it is a depressing place. We hurried through it and paddled away past Sonning to Shiplake, where we camped on the long island by the lock, getting up early the next morning and reaching Henley in good time.

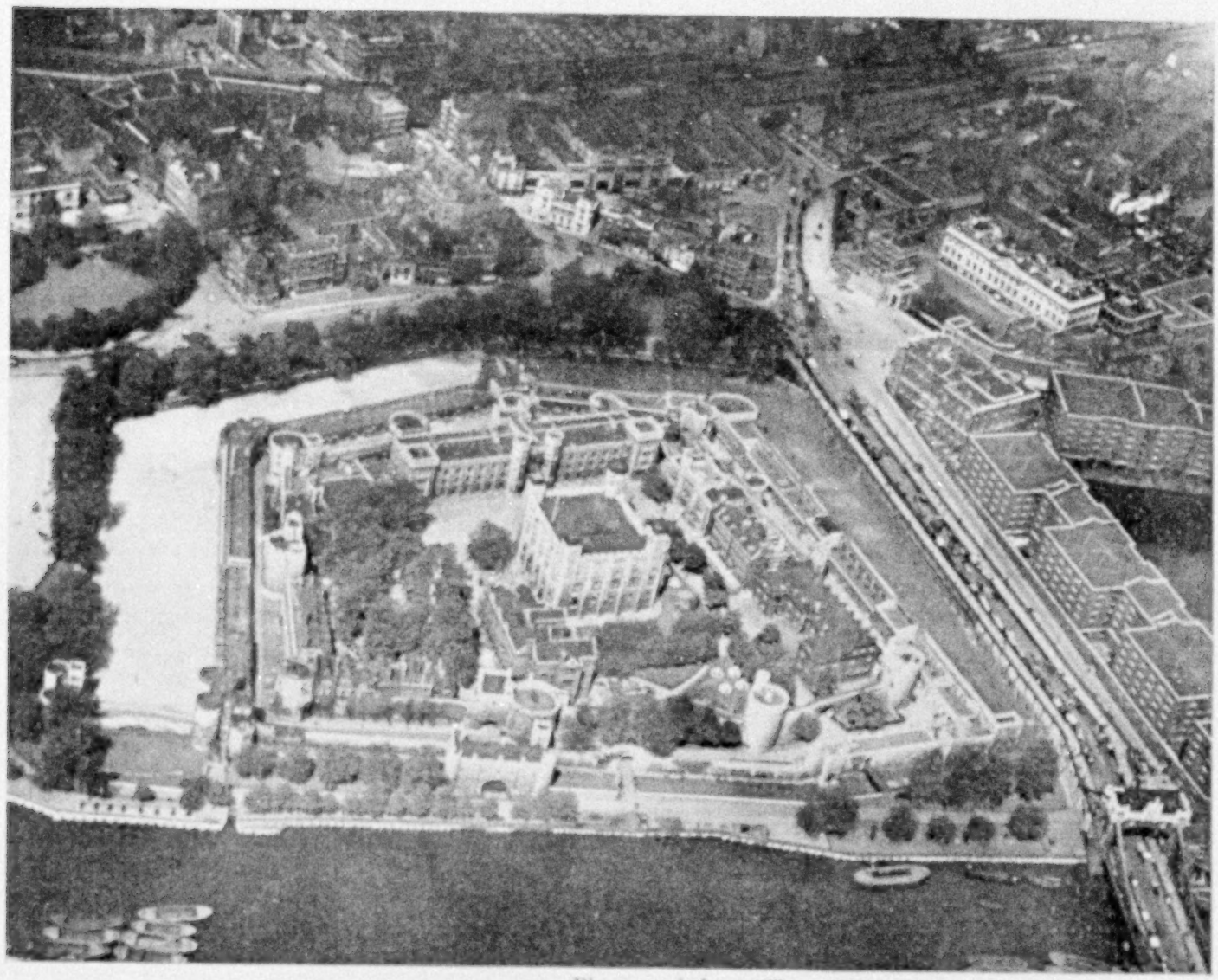
Henley is a quiet little place for fifty-one weeks in the year; but for one crowded week in July it is the scene of the first river regatta in the world, and here once again we have a typical picture of English life.

From the bridge there is a clear view of the course almost down to the starting point. The course is kept clear by white booms and posts, and along these on either side are the boats and punts of the spectators, often twelve or fifteen rows deep (see page 489).

To the left runs a series of club lawns, chief of which is the famous Phyllis Court Club, gay with trees, flowers, flannels, blazers, and dresses. On the right is the tow-path, hidden beneath the crowd who press down to the water's edge.

The whole scene is a glorious riot of color, health, and sunshine, while in the middle is the cool green water, broken only by the racing boats coming swiftly up the straight, accompanied by an ever-growing roar from the partisans on either side.

To be a member of the crew which wins the Grand Challenge Cup at Henley is every oarsman's ambition and is a feat



Photograph from "Topical," © Central Aerophoto Co., Ltd.

SEEING THE TOWER OF LONDON FROM THE AIR, WITHOUT BY-YOUR-LEAVE OF THE BEEF-EATERS

In the center is the White Tower, with its treasured instruments of torture and old armor and the prison of Sir Walter Raleigh. Beneath St. Thomas's Tower, beside the Thames (in the foreground), is the famous Traitors' Gate, through which prisoners of high rank were led to their confinement. Just behind this is the Wakefield Tower, in which the Crown jewels are kept. The wardens of the Tower (the Beef-eaters) still wear the costumes of the Tudor period and form, together with the Life Guards of Whitehall, the most interesting living sights of London.

which entitles him to a place among the immortals.

HOME OF A NOTORIOUS EIGHTEENTH CENTURY CLUB

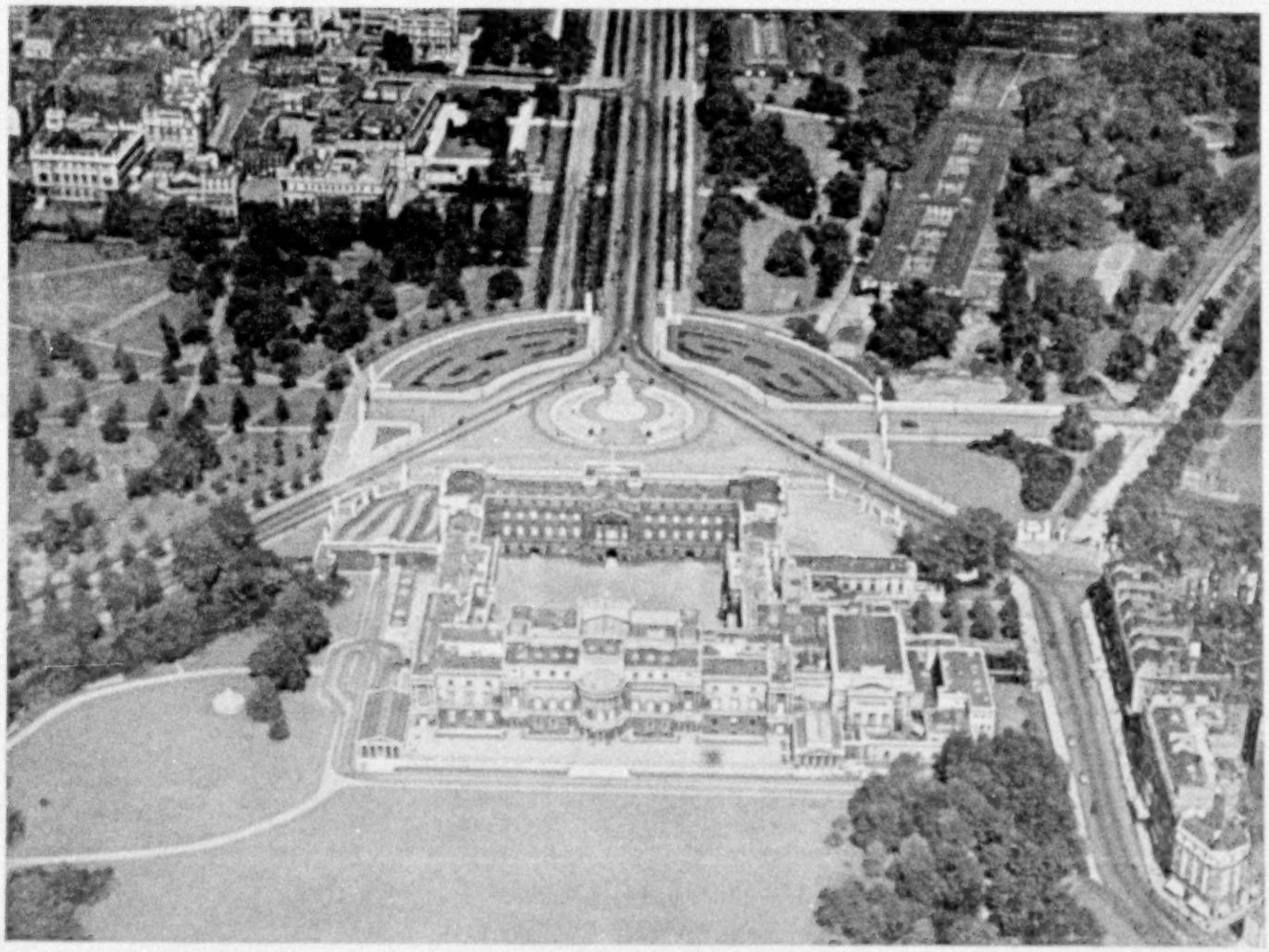
At other times the course is only a long open reach, down which we made good progress past Remenham, and through Hambledon Lock, until we came to Medmenham and its ruined Abbey. Originally a Cistercean foundation, it was dissolved at the Reformation; but two centuries later it acquired a new lease of life.

Sir Francis Dashwood, a leading exquisite of the eighteenth century, made the Abbey the headquarters of his "Society of the Monks of St. Francis," or the Hell Fire Club, as it was called.

Local tradition still tells how on the nights of club meetings the villagers locked their doors, turned out the lights, and sat quaking for fear they should attract the attention of the "monks." No greater contrast than the life of these irreverent jesters and their grim predecessors, the Cistercians, bound by a vow of silence, can well be imagined.

BISHAM, HOME OF ANNE, PRISON OF ELIZABETH

A little lower is Bisham, a place with a most eventful history. Originally a preceptory of the Knights Templar, it be-



Photograph from "Topical," © Central Aerophoto Co., Ltd.

BUCKINGHAM PALACE, THE LONDON RESIDENCE OF ENGLAND'S KING

Beyond the palace is the fine Victoria Memorial, at the head of The Mall. To the right is the upper end of St. James's Park, with Birdcage Walk at the extreme right. A part of St. James's Palace is seen at the left, beyond a corner of Green Park. Grosvenor Place and fashionable Belgravia are directly below the point from which this airplane photograph was made.

came a priory of the Augustinians, and at the Dissolution passed into the hands of Henry VIII, who gave it to his divorced wife, Anne of Cleves. Her marriage is one of the ironies of history. Henry's minister, Cromwell, arranged it for his own ends, assuring Henry that the lady's looks were universally admired. The King later described her as "a great Flanders mare," and the difference of opinion proved fatal.

An eye-witness at their first meeting said that Henry "was marvelously astonished and abashed," scarcely spoke, and forgot to give her the present he had brought. However, he married her; but Cromwell was soon disgraced and a divorce was arranged. Later, Bisham served as a prison for Queen Elizabeth during the stormy days of her sister Mary, and it finally passed into the hands of the Vansittart family, who still own it. In the church close by lies Warwick, the Kingmaker, brought hither after his death at Barnet in 1471; also Salisbury, who did good service at Poitiers.

The Thames now changes its character. The scenery is still very beautiful, but much of the historic interest has gone, and the towns are now pleasure resorts of modern growth rather than romantic or interesting reminders of the past.

We hurried over this final stage of our voyage. Instead of fields and open parkland, the river is lined with trim lawns, decked with flowers and smart houses, while pleasure craft of every description, from steamboats and electric launches to humble canoes and punts, are more than plentiful.

Past Marlow and Bourne End, with its wide sailing reach, we paddled quickly, and then drifted slowly down past the glorious Cliveden woods, which would be

Photograph by Maynard Owen Williams

AT THE FEET OF THE SPHINX BESIDE THE THAMES

The British workman reading his newspaper is oblivious of the centuries which look down upon him in the form of Cleopatra's Needle, brought to London from Heliopolis. This is one of the two bronze sphinxes at the base of the famous obelisk presented to the British Government by Mohammed Ali.

the most beautiful reach on the river were it not for man and his works. At the end is Boulter's Lock, the most fashionable, and so the most artificial, spot on the Thames. Its appearance on Ascot Sunday has been the subject of innumerable paintings and photographs.

"THE MOST REGAL BUILDING IN THE WORLD"

Below is Maidenhead, now little more than a week-end residence for wealthy Londoners, and a mile or so farther we get our first view of Windsor Castle, under the shadow of which we moored our canoe a few hours later—our voyage ended.

Windsor was a fitting goal. The castle is, perhaps, the most regal building in the world. Founded by William the Conqueror, it has always been a favorite royal residence, and to do justice to a tithe of its interests would demand a volume, and that a large one, in itself (see page 492).

Nestling under its shadow is the little town, and a few fields away Eton College, the most famous school in England (see page 494).

Here we bade farewell to Father Thames, after a journey of 250 miles through the heart of England, which had shown us more variety of interests—quaint, beautiful, and historic—than can be shown by any other area in a land full of beauty and possessing a noble history of nearly two thousand years.

Notice of change of address of your GEOGRAPHIC MAGAZINE *should be received in the office of the National Geographic Society by the first of the month to affect the following month's issue. For instance, if you desire the address changed for your July number, the Society should be notified of your new address not later than June first.*

Photograph by U. S. Air Service

NEW YORK'S SKYSCRAPERS AS SEEN FROM THE SKY

The starting point for the United States Army Air Service trail-blazing flight of 4,500 miles to Nome, Alaska (see text on opposite page).

THE FIRST ALASKAN AIR EXPEDITION

By Captain St. Clair Streett, U. S. A. S., Flight Commander

MARCO POLO and De Soto must have enjoyed the same mingling of eagerness and apprehension that moved the four aviators designated by the United States Army Air Service to blaze the pioneer air trail from the nation's capital to its furthermost possession at the northeast end of the continent.

Like the pioneers who drove their prairie schooners in '49 westward across unmeasured distances and through the constant perils of ambushed enemies, so did we, in our pioneer flight to Alaska, come to look upon every forbidding stretch of landscape we passed as an ambush of danger, active or passive, depending solely upon the fidelity and dependability of our Liberty motors to carry us over and beyond.

A spirit of romance and adventure dominated the individual pilots who participated with me in that flight; but beyond the strict military reason which occasioned this expedition, a more fundamental purpose existed in the minds of the aviators. Put into words, it was this:

"Yesterday a month was required to reach the Yukon; if our expedition succeeds, it will prove that the Yukon is but three days distant—by airplane!"

A FLIGHT WITHOUT PARALLEL

Our airplanes were the well-known army De Havilands, similar to those we used in the war. They were equipped with the 400 horsepower Liberty motor, capable of propelling us through the air at the rate of 115 miles per hour.

Each of us carried in the rear seat a tried and true mechanic, for we knew that we were undertaking a flight without parallel in the short annals of aviation. Reaching Alaska depended upon our ability to make our own repairs en route.

Nome lay 4,500 miles away, over rough and uncharted country, beyond the Great Divide of the Canadian Rockies. Fogs and storms would be encountered; landing fields must be located; engines and planes must be kept in the pink of condition, to avoid letting us down into some mountainous region far distant from the haunts of men.

The consent of the Canadian Government to fly over its territory had been cordially granted. Study of the government maps, consultations with the weather bureaus, and reports from the cities and towns along the proposed route followed.

It was determined to lay a course westward from New York to Erie, Pennsylvania; thence over Grand Rapids, Winona, and Minneapolis, west to Fargo and Portal, North Dakota. From this point we would be able to take the plunge into Canada over the fertile wheat belt of Saskatchewan to Edmonton and Jasper, in Alberta.

Then would come the fearful jump over the Great Divide, which, if successful, would lead us over the towns of Wrangell, White Horse, Dawson, and Fairbanks to the Yukon River and Nome (see map, pages 500-501).

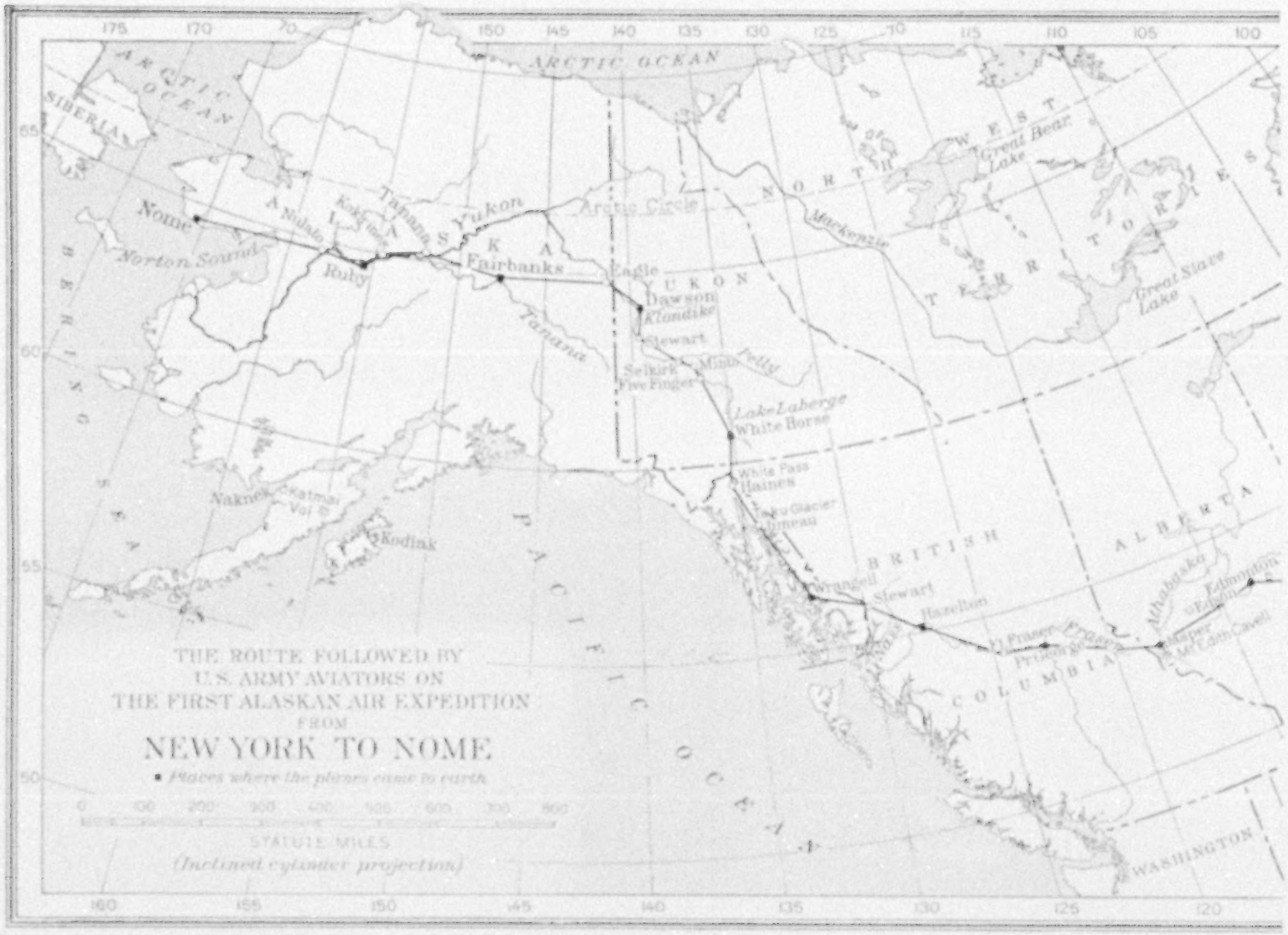
THE START

On July 15, 1920, at midday, we stood at attention before our airplanes on Mitchel Field, New York, and received the parting instructions of General William Mitchell, our motors slowly turning over and our machines packed and ready for flight. My machine was Number 1, with Sergeant Edmund Henriques as mechanic; Lieutenant Clifford C. Nutt, with Lieutenant Erik H. Nelson as navigating and engineering officer, had Number 2; Lieutenant C. E. Crumrine, with Sergeant James D. Long as mechanic, flew Number 3, and Lieutenant Ross C. Kirkpatrick, with Master Sergeant Joseph E. English as mechanic, Number 4.

Precisely at thirty-three minutes after the noon hour our little flight taxied across the field and took off. The four motors were functioning beautifully as we climbed to 1,500 feet, circling the field and getting into formation. Turning westward, with spirits high, we set a course of 298 degrees on our compasses.

Motoring through limitless skies should be regarded as a boon to humanity, a gift from science, annihilating time and distance, I thought to myself, as we roared swiftly along toward our first night's stop at Erie.

XUM



A SKETCH MAP SHOWING THE ROUTE AND LANDING FIELDS OF THE FIRST AIR EXPEDITION

Stupendous as seemed the long journey before us, it amounted in fact only to a succession of hops from place to place. What could be more delightful than a midsummer's excursion like this! Nome and the Yukon gold fields seemed almost in sight.

I was awakened abruptly from my reverie by an ugly vision ahead. Above the palisades of the Hudson a black wall of fog and rain intercepted our path. The pilots behind me spread apart to avoid collisions, as we entered the thick atmosphere.

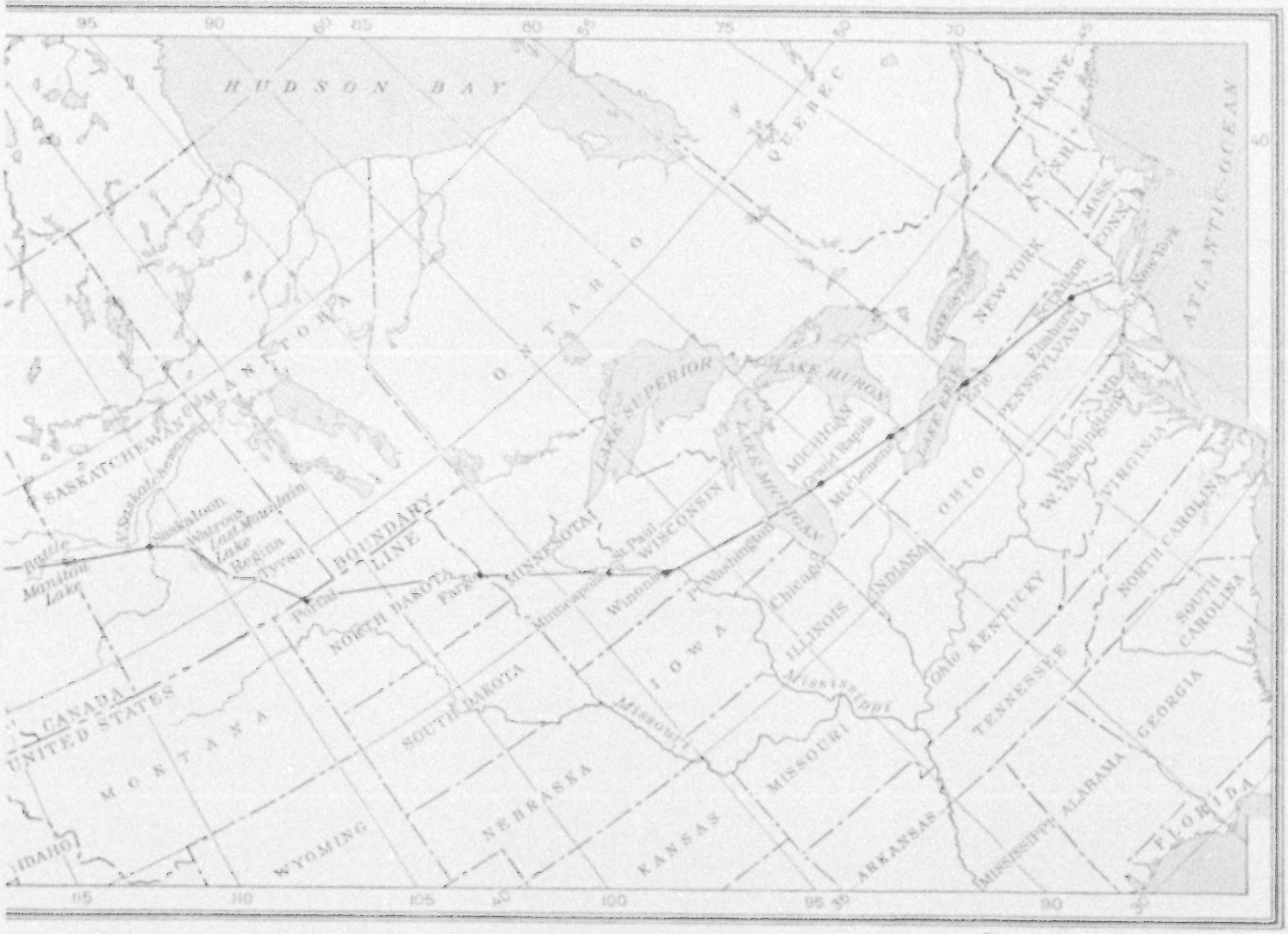
The rain clouds hung 1,500 feet above the earth. I climbed up to get above them, while the others continued steadily ahead into the rain. Ten minutes after we had left Mitchel Field I saw the last of my companions for the time being.

For an hour and twenty minutes I flew through the most bitter rain-storm I have ever encountered. I climbed to 9,000 feet and still there was no top to the storm. Hail-stones smote me at that high, cold level, at the speed of one hundred miles an hour. Knowing this barrage would splinter the propeller, strip the wings, and seriously injure the machine, I cut off the motor and dropped down below the clouds in search of a suitable landing place on which to wait out the storm. As the earth came into view below the clouds, I recognized the country and found I was just south of Scranton, Pennsylvania.

Farther along I noted a field yet untouched by the storm. It was near Elmhurst, Pennsylvania, and I determined to land.

SMASHING AN AXLE

Five minutes later my machine settled down into the hayfield of Mr. Benny Troop, sunk deep into the luxuriant grass, and struck a hidden ditch. The axle of my landing gear snapped and the machine



Drawn by A. H. Bumstead

FROM NEW YORK TO ALASKA, COMPLETED IN 53 HOURS AND 30 MINUTES FLYING TIME

slid along in the tall grass for fifty feet, luckily stopping without turning over. What appeared to be a beautiful, smooth landing field from above proved to be a rough, plowed, and bumpy surface, covered with the smoothest growth of hay imaginable!

Nome was still but a fraction under 4,500 miles away, and here in Mr. Troop's deceitful hayfield my mechanic and I sat regarding the broken axle in the pouring rain! Machines 2, 3, and 4 might be marooned in other fields or might be nearing the city of Erie. I had no way of learning of their whereabouts until they communicated with me.

There was nothing for it but to replace the broken axle and get away again as soon as possible. I telegraphed back to Mitchel Field for an axle. It was delivered the following morning, and after three hours' work we had it installed and were ready to take off.

A runway had been cut across the hayfield to permit us a passageway out. But the gasoline and oil I had ordered from the nearest town had not arrived. Upon investigation we discovered that the fuel truck was stalled in the mud of a country road not far from us.

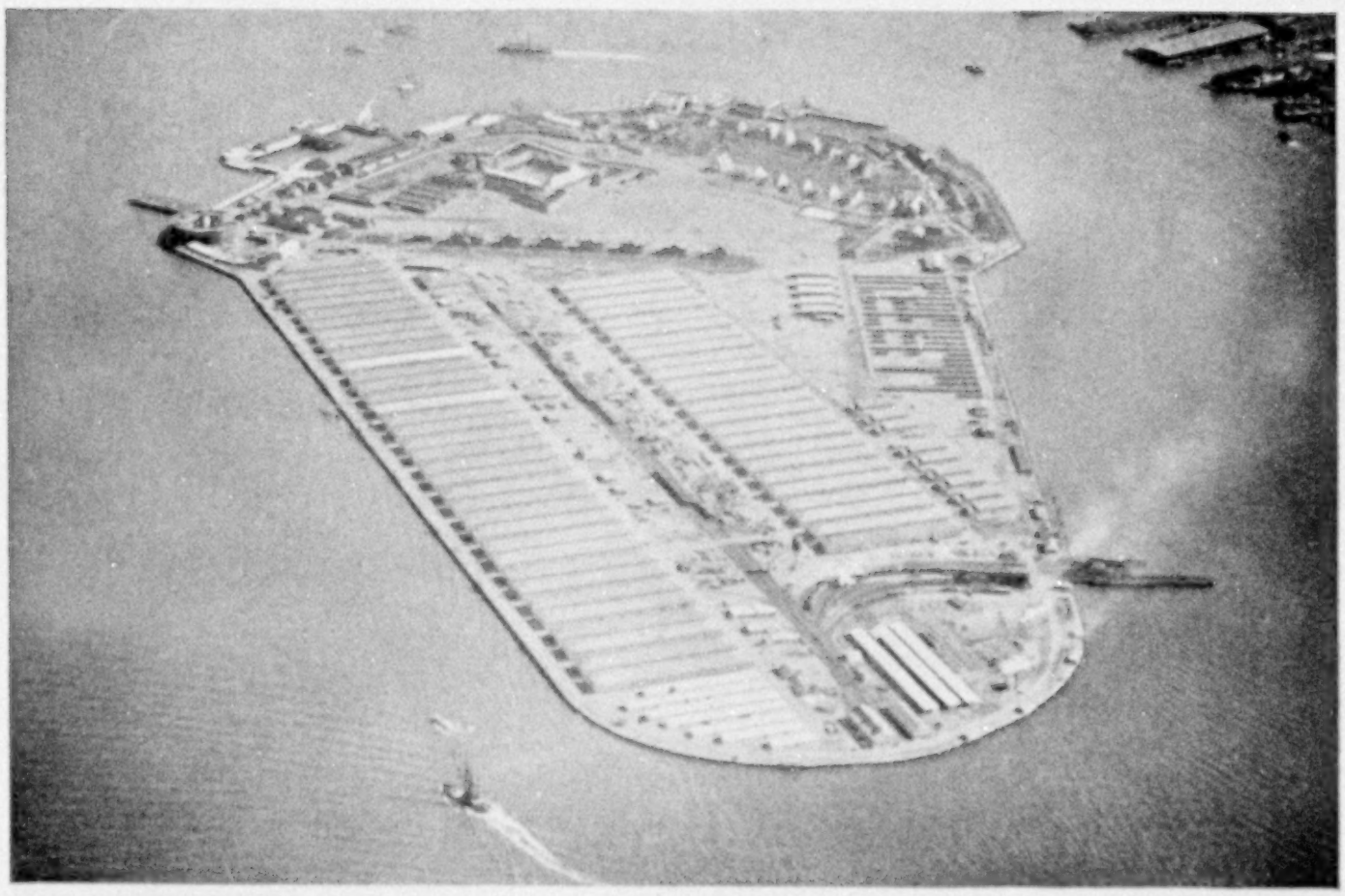
All hands were called to the rescue, and after several hours' work we disinterred the truck, escorted it to the hayfield, and filled the airplane's tanks. Darkness was falling. It was necessary to lay over for another night.

Upon arriving at Erie the next morning, after about four hours' flying, I found all the members of my flight had safely reached there the first day in 5½ hours from New York. They had flown through the rain, mostly by instinct, since the visibility was bad and the maps we carried were of little use.

Western Pennsylvania is rough and well covered with woods, offering few

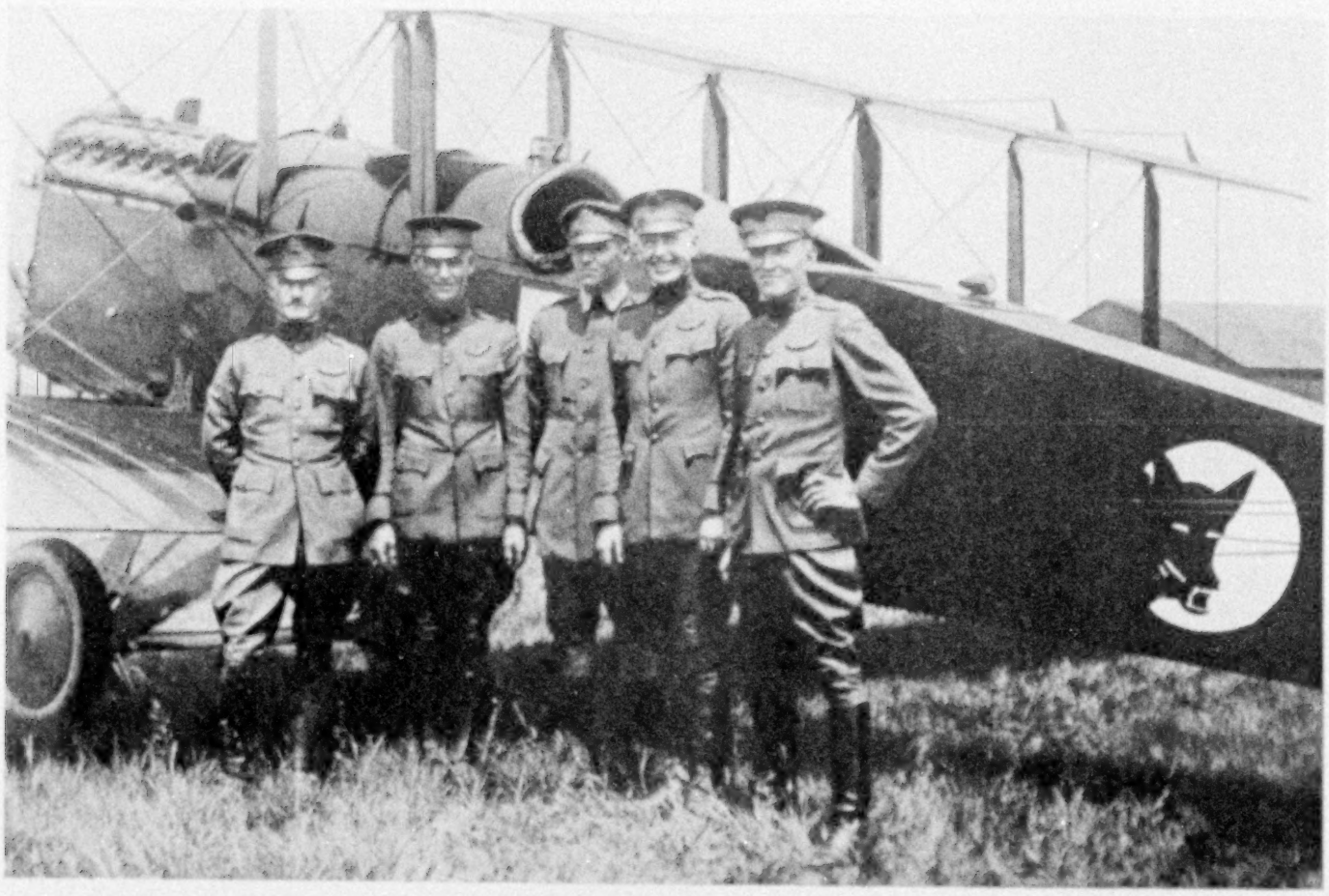
THE BEST-KNOWN LANDMARK OF THE NEW WORLD

The members of the First Alaskan Air Expedition bade farewell to the Statue of Liberty at noon, July 20, and it was a welcome sight upon their return, October 20. The flying time for the round trip of 9,000 miles was 112 hours.



Photographs by U. S. Air Service

LOOKING DOWN UPON GOVERNOR'S ISLAND, NEW YORK HARBOR



Photograph by U. S. Air Service

PILOTS OF THE ALASKAN EXPEDITION

From left to right, Captain St. Clair Streett, Flight Commander; Lieutenant C. C. Nutt, Lieutenant R. C. Kirkpatrick, Lieutenant E. H. Nelson, and Lieutenant C. E. Crumrine.

spots where landing an airplane is possible. Few landmarks are identified easily until one reaches Lake Chautauqua, some 40 miles east of Erie. Erie itself is clearly identified from the air by the peculiar shape of a peninsula that extends into Lake Erie and hooks eastward.

The rain continued for several days, soaking the field at Erie until it was a bog. Pilots and mechanics were kept busy oiling metal parts to prevent rust. Every part of the machines was examined constantly, for we had 9,000 miles to cover in these vehicles, and in the regions we were to traverse, spare parts could not be obtained.

The townspeople of Erie overwhelmed us with invitations and many were the kindnesses showered upon us by visitors to our field; but we were eager to get away as soon as possible. We watched the heavens and studied the weather reports as we oiled and mended and waited.

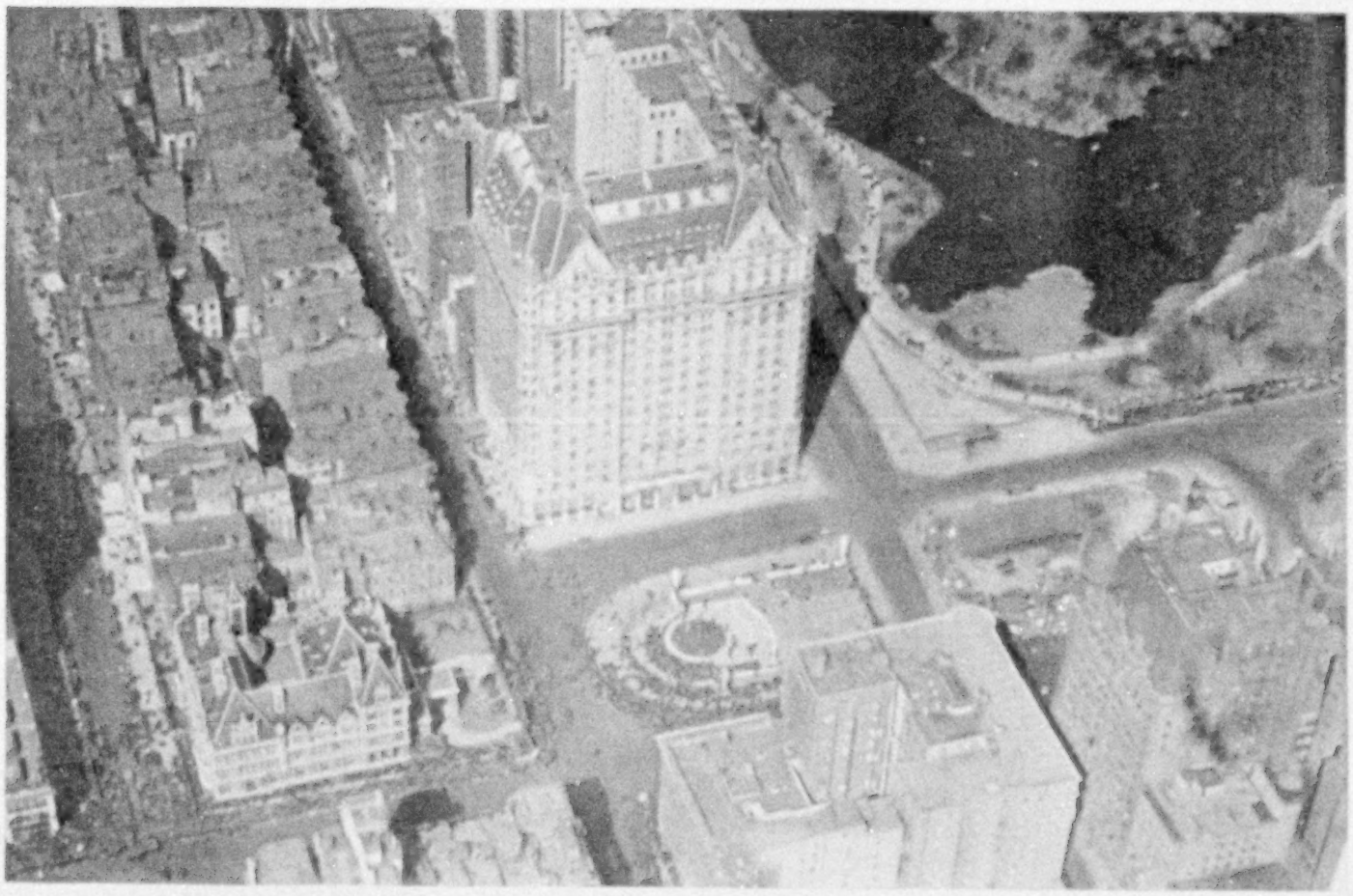
MIRED IN THE ERIE FLYING FIELD

Finally, on July 20, five days after leaving Mineola, the storm subsided and we determined to push on to Grand Rapids, Michigan.

Lieutenant Crumrine, in Number 3, started off first, in order to take some oblique photographs of the field from the air. He settled himself into his seat, waved us adieu, and taxied over the heavy turf. He opened up his motor and started down the field. Suddenly his wheels cut deep into the surface. He quickly cut off his motor, but the momentum of the machine carried it a hundred feet or so deeper into the soft ground, where it eventually stood with one blade of the propeller sticking in the mud.

A team of horses was required to drag the De Haviland out. This field, apparently quite substantial on the surface, had been converted by the long and heavy rains into a wretched bog. The airplane was not injured, but the mishap had demonstrated how impossible it would be to get away from so soft a surface.

The balance of that day we spent in rolling the field. To our great dismay, the Kelly truck roller stuck fast in the mud, and then the horses, in trying to



THE PLAZA AND CENTRAL PARK, NEW YORK CITY

Photographs by U. S. Air Service

A VIEW OF HARLEM RIVER FROM THE AIR (SEE ALSO PAGE 521)

Photograph by U. S. Air Service

THE HEART OF NEW YORK—TIMES SQUARE

pull out the roller, themselves became bogged!

A THRILLING TAKE-OFF

Finally, late in the afternoon, Lieutenant Crumrine wheeled his machine again to the starting line and, with the motor turning over, examined the prospect ahead. He had six hundred feet of runway which had just been rolled. Then came a line of trees forty feet high which had to be cleared. With considerable anxiety we gathered around to watch his take-off.

Crumrine is a finished pilot. If any one could get out of such a field, he could. He opened up the motor and started down the course, full out.

When almost at the end of the runway his wheels still clung to the mud. With increasing speed he headed straight on into the line of trees, absolutely unable to stop his momentum or to turn aside.

While our hearts mounted up into our throats and a momentary paralysis stopped their beatings, we saw Crumrine suddenly stick the nose of his airplane straight up. It zoomed the tips of the trees like a rocket, leaving only a foot or two space to spare. It was the closest call I ever want to see.

Crumrine snapped his photographs, then straightened out his course for Grand Rapids, and disappeared. Unwilling to risk any other machines on such a perilous get-away, we decided to stay over in Erie another night. With gloomy spirits and bad tempers, we put up our machines for the night and went into town to send in a report to Washington.

Photograph by U. S. Air Service

THE LAKE FRONT: MILWAUKEE

The U. S. Army airmen crossed Lake Michigan slightly to the north of Wisconsin's chief city. They flew over the widest body of water to be crossed on the voyage at an altitude of 7,000 feet (see text, page 508).

Next morning, July 21, we were up early and were examining the surface of the field at 6 o'clock. It was drying rapidly. At 9 o'clock Lieutenant Nutt took off successfully. Lieutenant Kirkpatrick followed. Number 1 was last to get away.

After so melancholy an experience in civilized Erie, Pennsylvania, what must we expect in remote Alaska, where airplanes have never landed, were my thoughts as I headed straight out across Lake Erie.

FLYING OVER LAKE ERIE

The day was misty and dull. Land was out of sight ten minutes after starting. Only gray-green waves, directly below me, were visible. Setting a course by 284 degrees on the compass, I flew for an hour and ten minutes, now and then imagining that I could detect in the motor's roaring a note of distress that might indicate its death rattle. The first view of the Canadian shore was a welcome sight.

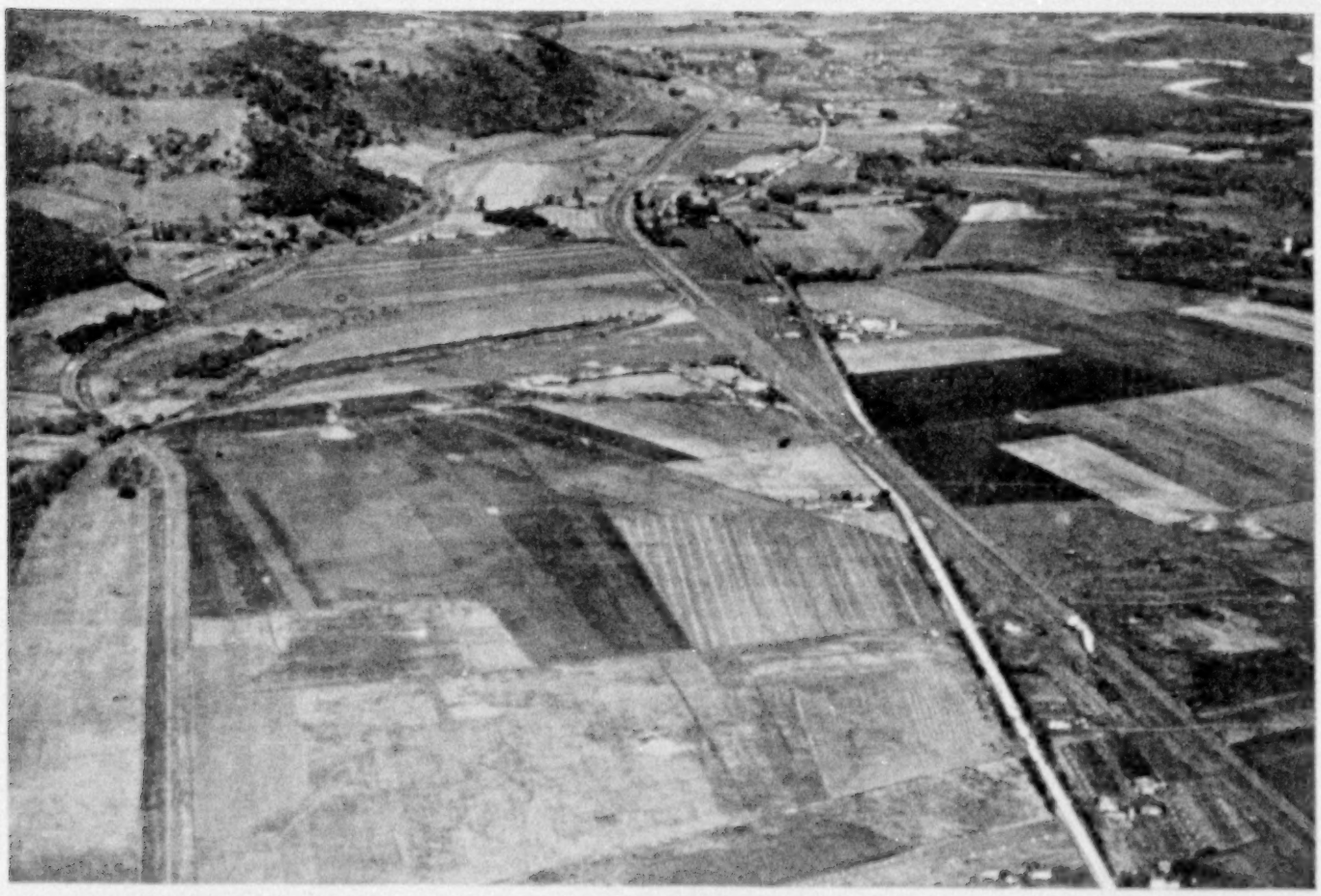
Flying sweetly over fair farming country, where a forced landing held no terrors, in sharp contrast with the chilly waters of Lake Erie, we reached and crossed the lower end of Lake St. Clair and landed for fuel at Mt. Clemens, Michigan, after two hours and forty minutes flying.

Here is located Selfridge Field, a government aviation field, named in honor of Lieutenant Thomas E. Selfridge, one of the American pioneers in aviation, who lost his life in an airplane accident at Fort Myer in 1908. After reporting to the commanding officer, I again left the ground and after an uneventful flight through thick weather and occasional showers, we sighted the Grand Rapids field and saw the three machines of our flight drawn up on a line, awaiting our arrival.

Crumrine had landed before dark the previous afternoon without mishap. Nutt and Kirkpatrick had flown over Selfridge Field without landing and had dropped down upon the Grand Rapids field on schedule time.

WINONA, NESTLING ON THE MINNESOTA SIDE OF THE MISSISSIPPI VALLEY

On both sides of the city hills rise sharply to an altitude of 1,000 feet and the prevailing winds through the valley often present difficult problems for the aviator landing on a small field (see text, page 509).



Photographs by U. S. Air Service

THE LANDING FIELD AT WINONA, SHOWING THREE OF THE FOUR PLANES ON THE GROUND

XUM

Photograph by U. S. Air Service

THE MISSISSIPPI RIVER NORTH OF WINONA

Again we were overwhelmed with invitations and kindnesses by the citizens and aviators, who came out to the field to welcome us. We remained on the field until 10 p. m., carefully grooming our airplanes for the next day's flight. Then we were free to avail ourselves of the hospitality of Grand Rapids.

SAILING 7,000 FEET ABOVE LAKE MICHIGAN

At 11 o'clock next morning all Grand Rapids was assembled around the field to see us take off. We left the ground at thirty-second intervals, taking off across the wind and down the race-track, which circled the field on which we had landed. We climbed to 2,000 feet and got into formation.

Setting a course of 284 degrees for Winona, Minnesota, and with an east wind blowing 15 miles an hour, we left Grand Rapids behind us, and twenty minutes later found ourselves above Grand Haven, on the shores of Lake Michigan. Visibility was not good, a ground mist limiting the view to a 10-mile radius.

We had reached an altitude of 7,000 feet as we approached the lake, so that in case of motor trouble we might have a longer distance to glide before reaching the surface of the water. From this elevation the De Haviland can glide, with dead motor, to any point within eight or nine miles.

Four ships were sighted as we crossed the lake, and, as may be imagined, we kept each ship fondly in view as we listened for unusual sputterings from our motors. An hour and ten minutes flying over water brought us above Port Washington, on the west shore of Lake Michigan.

At this juncture, and just as I was feeling particularly pleased with having placed behind us the widest body of water to be crossed on the voyage, I noticed that the indicator on my dash-board did not show any air pressure. I signaled my mechanic to fly the machine while I seized the hand pump, and the balance of the distance to Winona I pumped vigorously to maintain the flow of gas. Thus we continued with undiminished speed until the valley of the Mississippi was reached and the little town of Winona was sighted, nestling between the hills. Here I took control of the airplane and made the landing on the reserve tank.

Photograph by U. S. Air Service

ST. PAUL, MINNESOTA, FROM THE AIR

The domed white building in the left distance is the State capitol. Severe storms in the vicinity of Fargo, North Dakota, the next landing place, justified the airmen in enjoying the hospitality of the Twin Cities for two days.

On both sides of Winona the hills rise rather sharply to an altitude of 1,000 feet. The valley between runs northwest and southeast, so that the prevailing winds are always in one of these directions. An aviator must determine, before he lands his machine, the direction of the wind, and if possible he always heads directly into the wind as his airplane glides down to the field. If the wind is blowing 30 miles an hour, his speed of landing is increased or decreased by 30 miles, depending upon his coming in with the wind or against it.

If the field is small, it is of the utmost importance to notice the direction of the wind by observing smoke drift on the ground, then head into the wind and permit it to retard the speed of the airplane in relation to the surface of the ground.

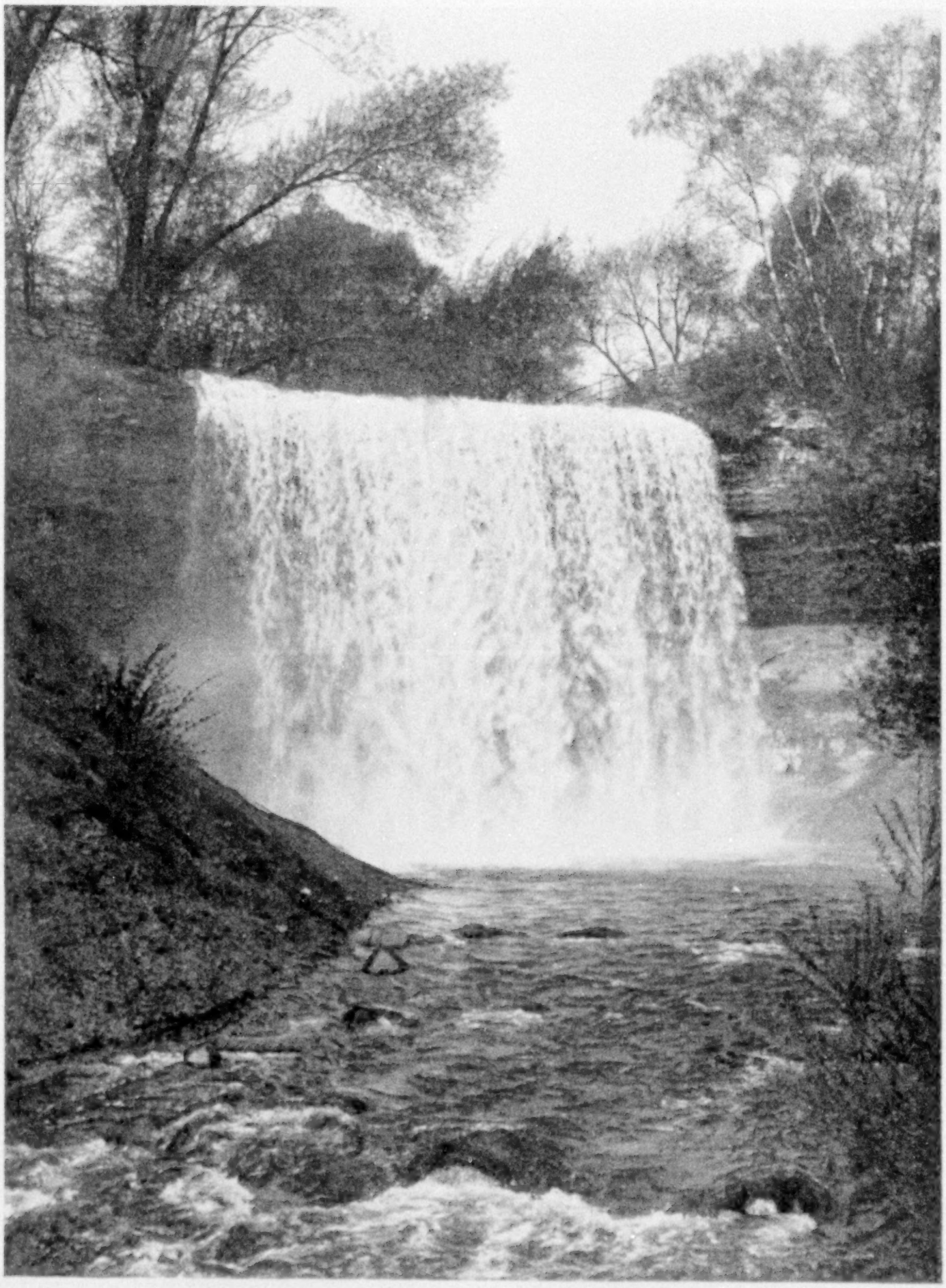
The citizens of Winona insisted upon our staying over to attend a luncheon arranged in our honor by the Chamber of Commerce of that city. I found a small particle of dirt had jammed open the pressure relief-valve on my gas tank. This was quickly removed, our gasoline and oil were replenished, and, as Minneapolis was but an hour and a half distant, we decided not to accept Winona's kind invitation.

I should say here that it is quite impossible to express adequately our thanks and appreciation for the wonderful hospitality extended to us by each community on our route. From city officials, from private citizens, and from fellow-aviators we received the most flattering and most kindly consideration.

THE TWIN CITIES HAVE A SUPERB FLYING FIELD

At 6:10 that evening we left the people of Winona standing gazing up at us with their "noses in air," as the French put it, and just an hour later we were joined on our route by a Curtiss airplane that had set out from Minneapolis to meet us and escort us in.

While still some distance from the Twin Cities we sighted ahead the glaring white race-track of concrete situated at



THE FALLS OF THE MINNEHAHA, MINNEAPOLIS, MINNESOTA

This lovely cataract, immortalized by Longfellow as the Sioux name given his heroine in "Hiawatha," richly deserves the appellation Laughing Water.

Photograph by U. S. Air Service

FARGO, THE METROPOLIS OF NORTH DAKOTA, TWO AND A HALF HOURS BY AIR NORTHWEST OF MINNEAPOLIS

the Speedway, in the center of which circle was the airdrome.

Four miles south of Minneapolis and four miles west of St. Paul, this landing field, smooth of surface, free of obstacles, and ample in dimensions, will prove a boon to commercial aviation and will place the Twin Cities well in advance of their rivals when this important development of air transportation gets under way.

My little flight closed up into close formation, and thus we circled the race-track's 2½-mile course before landing.

The people of the Twin Cities are enthusiastic over aviation. They applied for and obtained an aërial mail service by agreeing to furnish accommodation for the mail airplanes.

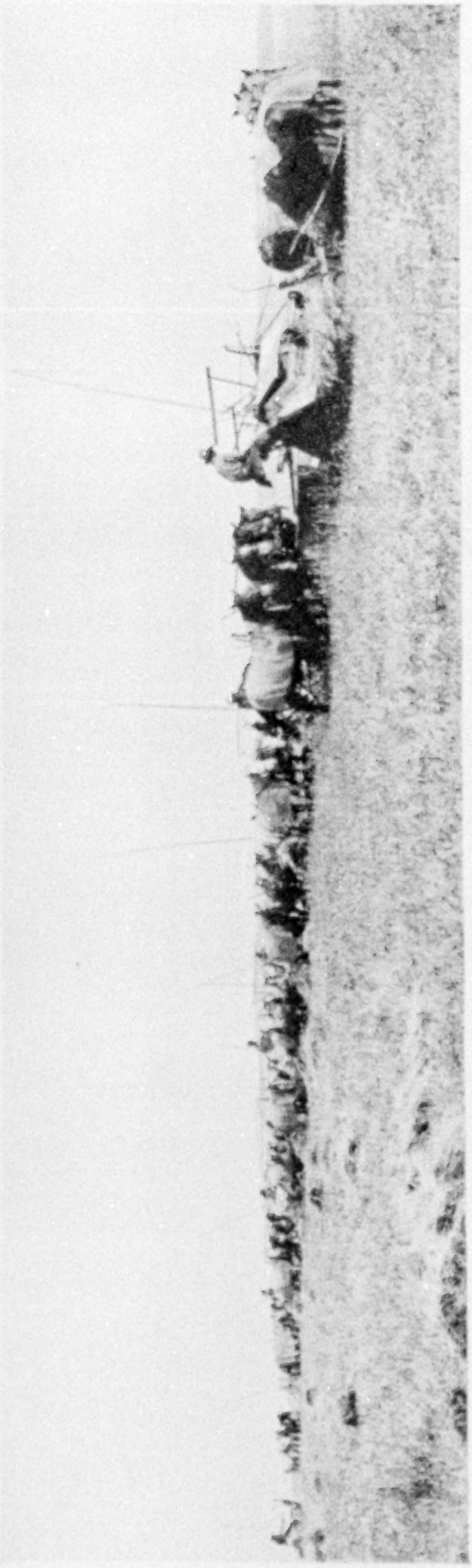
The country surrounding these cities is ideal for flying, landing fast airplanes being possible almost anywhere without danger of disaster. The Aviators' Club and the Chamber of Commerce confidently expect that their airdrome here will become the aëronautical center of the middle northwest.

We were now about to leave the busy centers of the United States for the wilds of Canada. It was with especial care that we looked over the airplanes that were to carry us ever farther away from the source of supplies.

For two days severe storms raged about the region of Fargo, North Dakota, which was to be our next landing place. We improved the time, therefore, in polishing up motors and strengthening machines.

MINNESOTA AND DAKOTA LANDSCAPES FROM THE AIR

At 11:47 a. m. on July 24 we bade our hosts of new friends good-by, and left the hospitable ground of the Twin Cities behind us. With a 10-mile wind across our line of flight, we set a course for Fargo, 225 miles distant.



BINDERS AT WORK ON A NORTH DAKOTA FARM: A LAND OF SMILING FIELDS

Ten minutes of flying through clouds brought us suddenly out into a beautiful, clear sky. For the first time we feasted our eyes upon the famous clear landscapes of the West.

From our altitude of 5,000 feet we could see the horizon, 40 or 50 miles away, all around us. Never had I flown through an atmosphere so pure and clean. Innumerable small lakes dotted the lovely landscape. Smiling and well-kept farms occupied every foot of dry land.

Our motors hummed along joyously, turning the propellers 1,400 revolutions per minute. We were moving slightly faster than a hundred miles per hour, with the aid of a favorable wind.

Soon we sighted our destination, surrounded, as usual, with motor cars and hundreds of spectators awaiting our arrival.

Another public luncheon was being held for us, and again we were compelled to disappoint our hosts, for our first attention was due our machines. We munched sandwiches while we looked over our motors, washed down the ships, and refilled the tanks with fuel, after our short jaunt of two hours and twenty-four minutes. Then we gladly accompanied our hosts into town.

Fargo is the largest city in North Dakota, and it is situated in the center of a country of great distances. Good landing fields abound anywhere within a radius of 200 miles, and the use of the airplane in this locality will prove to be of infinite value.

Excusing ourselves early that evening, we looked over maps and weather reports and piled into bed at an early hour. Tomorrow's flight would be the last hop over Uncle Sam's territory until Alaska was reached. Our machines were in perfect condition and the spirits of the pilots and crews were high. Although the difficult part of our journey was still ahead, our hearts were light and we had every confidence in the success of our expedition.

Start was made for Portal, North Dakota, next morning, July 25, with a gentle 10-mile wind on our tail bearing us along. Under 4,000 feet we found the air remarkably bumpy, probably a natural aftermath of the storm. Above that level the air was as smooth as velvet.

As we progressed, the terrain became rolling and, finally, rocky. Numerous alkaline lakes dotted the landscape.

Crumrine snapped photographs as we flew, notes were taken for recording full description of all details that might be of military interest, and a careful log was kept of each incident and feature of our journey.

With a favorable wind all the way, we covered the 200 miles to Portal in three hours and ten minutes, landing at 1 o'clock in the afternoon.

Although we had procured advance information as to the size and location of all the landing fields on our route, we discovered that there were many small details that had not been disclosed to us.

LANDING ON A CITY DUMP

Some of these overlooked details caused us costly delays and trouble. At the Portal field, for instance, which we found just over the Canadian line, to the northwest of the town, we followed our usual custom of flying low over the field, circling it two or three times while we studied the surface of the ground to note obstructions, such as ditches, fences, or stumps. Lieutenant Kirkpatrick came down first, landing perfectly, but cutting his tires badly on the glass that was strewn along the runway. The town had used this field for a dump in times past!

Lieutenant Crumrine and I landed simultaneously, without mishap. Lieutenant Nutt landed last, rolled over an inconspicuous bump, and snapped off his tail skid.

These minor accidents illustrate the nature of the repairs that were necessary to be made each night before our little caravan could be ready for the next day's flight.

A garage at Portal was the only possible source of help. After attempting to weld a vertical shaft without success, we picked up a section of a Ford axle which happened to be exactly the same size. This was installed and proved to be a very satisfactory brace.

All our repairs were completed by 8 o'clock that evening, and everything was in readiness for our hop-off into Canada the next morning. The country people for 50 miles around had assembled to witness our arrival and to help us in our work. They were very cordial and we learned from them something of the nature of the country over which we were to fly on the morrow.

A SURPASSINGLY BEAUTIFUL VIEW OF SASKATCHEWAN

If the readers of THE GEOGRAPHIC will turn to their maps of Saskatchewan, they will find portrayed a wide, smooth country, fairly dotted with small towns and villages. If they had been with us on the morning of July 26, 5,000 feet aloft, flying through a sky of surpassing loveliness, the air so clear that it tingled, the flat farms spread out beneath them with extraordinary distinctness as far as the eye could reach, they would have believed readily enough that the entire map of the district was spread before their eyes.

The atmosphere is so astonishingly clear and the view so extensive that it becomes confusing to follow a set course, because of the beautiful sameness of the scenery.

The Canadian Pacific Railroad ran beneath us. Tyvan, 40 miles east of Regina, we hit squarely, flying by compass, checking up our course by the railroad.

Every village along the railroad had its two or three huge grain elevators. The whole fertile area beneath our wings appeared rich in wheat-fields. The terrain as far north as Last Mountain Lake was perfectly flat. In this view from the air, one is impressed with the vastness and richness of this country.

Last Mountain Lake is a beautiful body of water extending northeast from the Regina vicinity almost to Watress, 70 miles away, yet it is not over three-fourths of a mile wide at any part. We were still 40 miles away from Regina when we saw it distinctly outlined ahead.

LANDSCAPE A GIGANTIC CHECKERBOARD

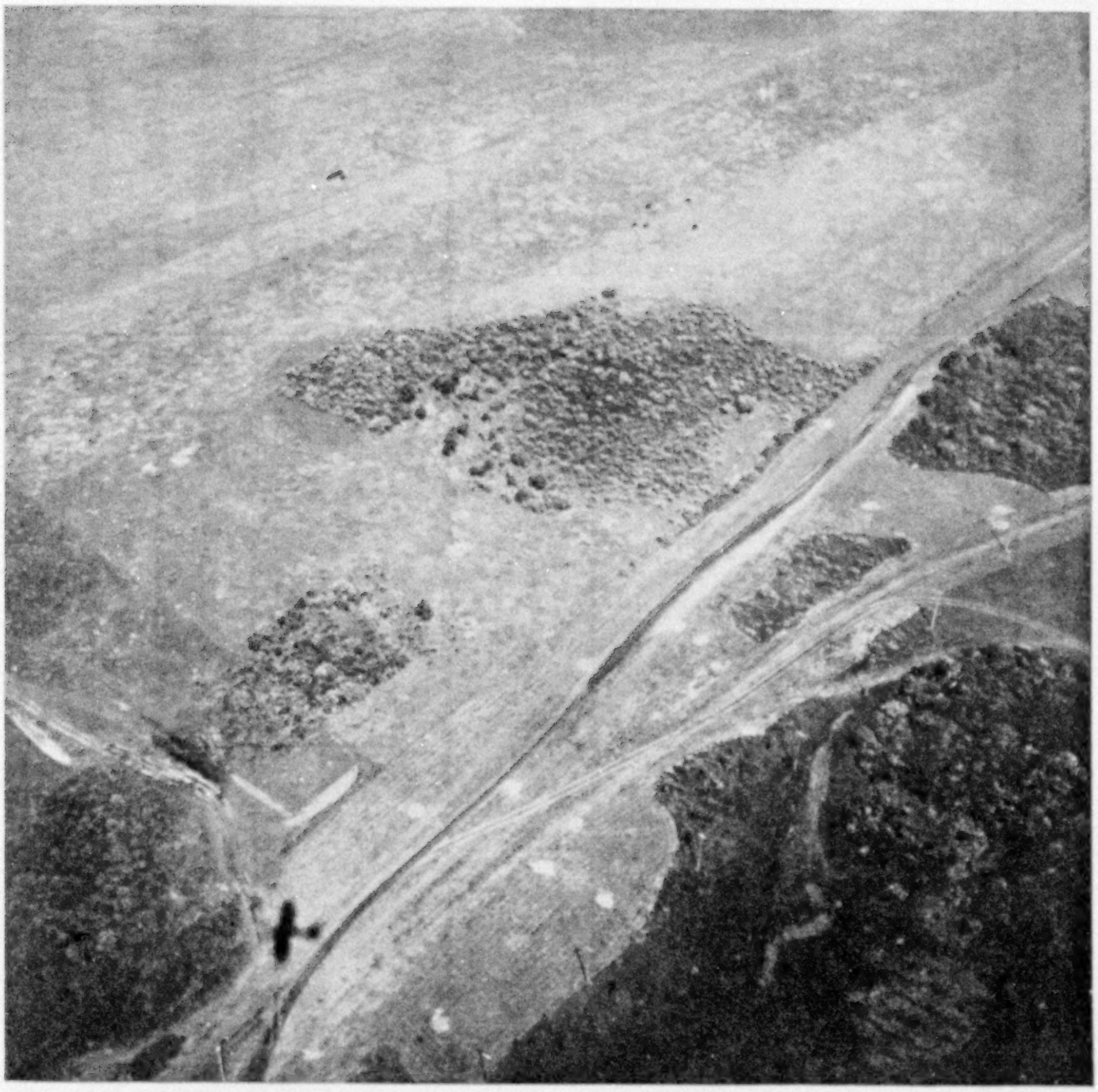
A sense of unreality is felt as the aviator sits, seemingly motionless, in the cockpit of his machine a mile above the gigantic checker-board of crisscross section lines which cut up this flat landscape and disappear away into the horizon, where they blend. As we proceeded we noticed thousands of acres of this land which have never been cultivated. Houses and ranches were few and far between.

Saskatoon and its river came into view

© Clinton Johnson

A TORNADO IN NORTH DAKOTA

The photographer who recorded this phenomenon says: "I noticed a very peculiar condition in the clouds. There was no wind blowing. The weather was hot. Clouds were moving from several directions to a common center, where the cloud-mass grew constantly darker and more threatening. There appeared to be no rain coming from the storm. Hanging downward from a low line of clouds, three whirling, funnel-shaped projections appeared, the two outside being soon drawn into the one in the center, which almost instantly started downward and soon was whirling along on the earth. The tornado was about ten miles from the camera."



Photograph by U. S. Air Service

THE BLACK HIGHWAY MARKS THE BOUNDARY LINE BETWEEN THE UNITED STATES AND CANADA AT PORTAL, NORTH DAKOTA

Note the shadow cast upon the ground by the airplane from which the photograph was made.

40 miles distant. We snapped photographs of the town and the landing field before we landed. A large white sign spelling W - E - L - C - O - M - E, near the hangar on the airdrome, spoke cordially to us and gave us our first intimation of the exceptional courtesies we were to receive from our Canadian cousins. We were met by the mayor, the city fathers, and by many others, and were welcomed warmly. We were officially given the freedom of the city and were extended every possible courtesy.

At first the crowds were given permission to inspect our airplanes. They had never seen machines of this type, and when they were told that these were the same airplanes we used in the war, they were greatly interested and examined them curiously. But the crowd became so densely packed about us that we could not proceed with our work. We reluctantly asked the chief of police to clear the field. This being done, we quickly finished refueling, and at 5:30 were ready to accompany the Saskatoon delegations to the city. On this first flight into Canada we had spent four hours and fifteen minutes in the air.

The mayor had procured rooms for us

Photograph by U. S. Air Service

SASKATOON, ON THE SOUTH SASKATCHEWAN

at the King George Hotel, but first he took us to the Y. M. C. A. rooms, where we were given an opportunity to take a swim. Then a public dinner in our honor followed. During the dinner I received a telegram from the Canadian Air Board, extending its compliments and congratulations. After dinner we proceeded to the City Club, where we were serenaded by the band of the Veterans of the Great War.

Saskatoon is only eighteen years old. It has beautifully paved streets and the houses have every modern convenience and luxury. The city is planned for infinite expansion. It is the center of the Saskatchewan wheat belt and its grain elevators can be seen for miles around. The University of Saskatchewan is here and the large office buildings and hotels are the equal of any in the country. Never have I known a people more enthusiastic over their city. As is usually the case in spacious countries, the individuals are generous, broad-minded, and unselfish. Their hospitality to their American visitors was unbounded and spontaneous.

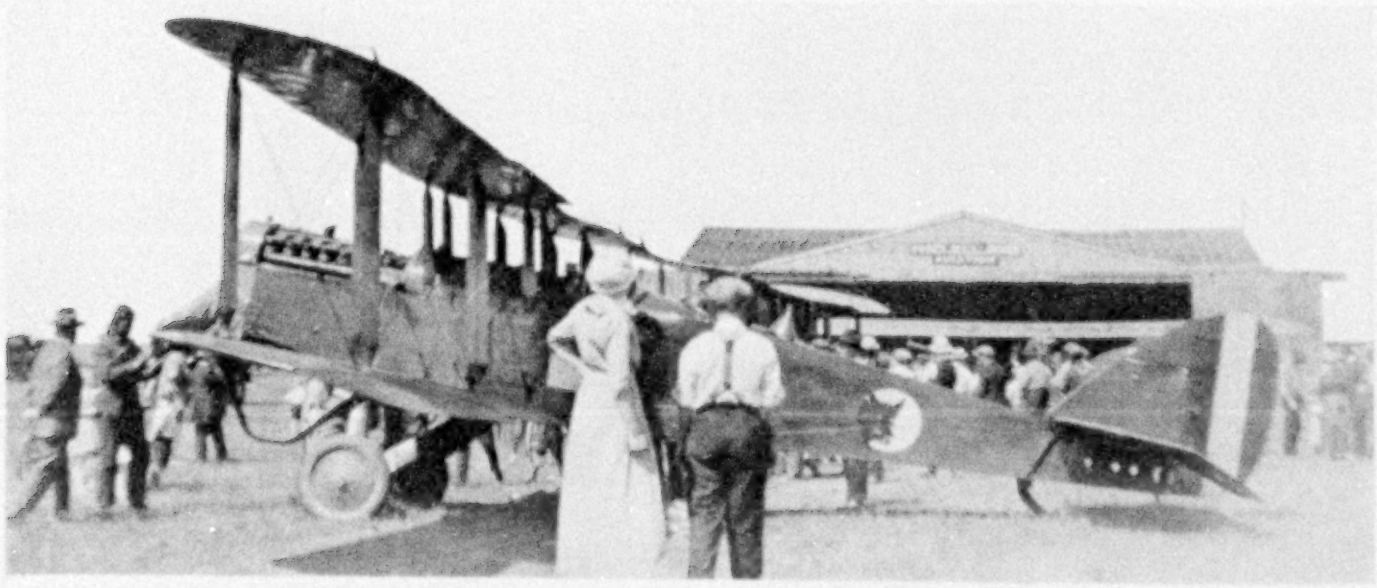
Although we were out early next morning for a 6:30 start, it was almost 10 before we left the ground. Most of Saskatoon was assembled to wish us good luck, and we could not leave without shaking every kind hand that was extended to us. After circling the field in formation, we headed for Edmonton, in Alberta, flying 269½ degrees on the compass.

FLYING OVER A LAKE COUNTRY

Twenty minutes out of Saskatoon and we were over the lake district, in which section the Indian reservations are situated. This country, just north of the North Saskatchewan River, is practically undeveloped. All section lines, so noticeable up to this point, disappear; the landscape is covered with small lakes; there are few settlers and little tilled land. Landings would be difficult, for the ground is covered with very thick swamp poplar 20 or 25 feet high.

Going west from Rose Haven, on the spur of the Canadian Pacific Railroad, the land again becomes clear and well tilled.

Flying into a head wind of 20 miles an hour, we tried every elevation, from 100 feet up to 7,000 feet, but the wind seemed the same at all levels. This fact is peculiar to a flat, prairie country.



Photograph by U. S. Air Service

THE PEOPLE OF SASKATOON HAD NEVER SEEN MACHINES OF THIS TYPE

At first the citizens of the hospitable Canadian town were given permission to inspect the airplanes, but soon the crowd became so dense that the airmen could not proceed with their work of overhauling (see text, page 515).

Lake Manitou, another beautiful body of water, soon appeared below our wings. One wondered why such an exceptional summer resort is going to waste. Fully 20 miles wide in places, several large islands with beaches of white sand dotted its surface.

From this lake we followed the valley of Battle River for 50 miles, leaving it when Beaver Hills Lake was sighted. This lake proved to be a shallow body of water with marshy banks.

Enormous and well cultivated fields extend over this entire area, unbroken until some 35 miles from Edmonton, when the ground was again covered with muskeg, lagoons, and small lakes. Just before reaching Edmonton we saw the first pine and spruce timber, bordering the river for about five miles on each side.

COLD-WEATHER SUPPLIES OBTAINED AT EDMONTON

Circling the city of Edmonton and taking several pictures from different sides, we landed on a field in the northeast section of the city, only to find that we had picked the wrong field. We had sent ahead for fuel, and this and the city fathers were awaiting us on the other field. Apologizing for our mistake, we again took off and landed at the spot prepared for us, where we found awaiting us several thousand people. Among them were the members of the Edmonton Board of Trade, who pressed us to come at once into town for luncheon. We compromised by accepting an invitation to supper at 7:30. In the meantime sandwiches and coffee were brought to us and we proceeded with our repairs.

Lieutenant Nutt had broken a wing skid and bent his right aileron horn on the second landing. My machine had sprung a leak in the gas tank. Many minor repairs were necessary, so we decided to stay over at Edmonton until a thorough overhauling of the airplanes was completed. We were at the jumping-off place now, facing sparsely settled, mountainous country.

Edmonton is a city of 70,000 population and is the metropolis of this section. The country about here is rich in coal and probably oil. A new railroad, being laid northward to the Peace River section, will lay open the tremendous resources of another rich region.

Jasper, our next objective, lay 107 miles deeper in the mountainous country. From now on it would be necessary to move with the greatest caution.

Old settlers in Edmonton gave us reassuring data concerning the route ahead. We neglected no opportunities to learn every fact available about the terrain, the climate, the landmarks for guidance, the height of the mountains we had to pass, and the character of the landing fields

XUM

Photograph by U. S. Air Service

TYPICAL NORTHERN ALBERTA LANDSCAPE, WEST OF EDMONTON

In the foreground is wooded marshland. In the middle distance meanders a serpentine wheat-field which follows the course of the most fertile land. In the background is a more symmetrical field.

that were being prepared for us in towns ahead that had never seen an airplane.

We procured heavy blankets for the cold nights that might be spent among the snows of the Rockies. Heavy clothing, food, and ammunition were likewise purchased. We interviewed train dispatchers to get weather reports from stations along the line. This information was found to be more reliable than that from any other source.

TURNING BACK FOR THE FIRST TIME

After four days' hard work on our machines, we bade the people of Edmonton good-by and set off on the morning of July 31 for the flight to Jasper, our stock of supplies adding considerable weight to our load.

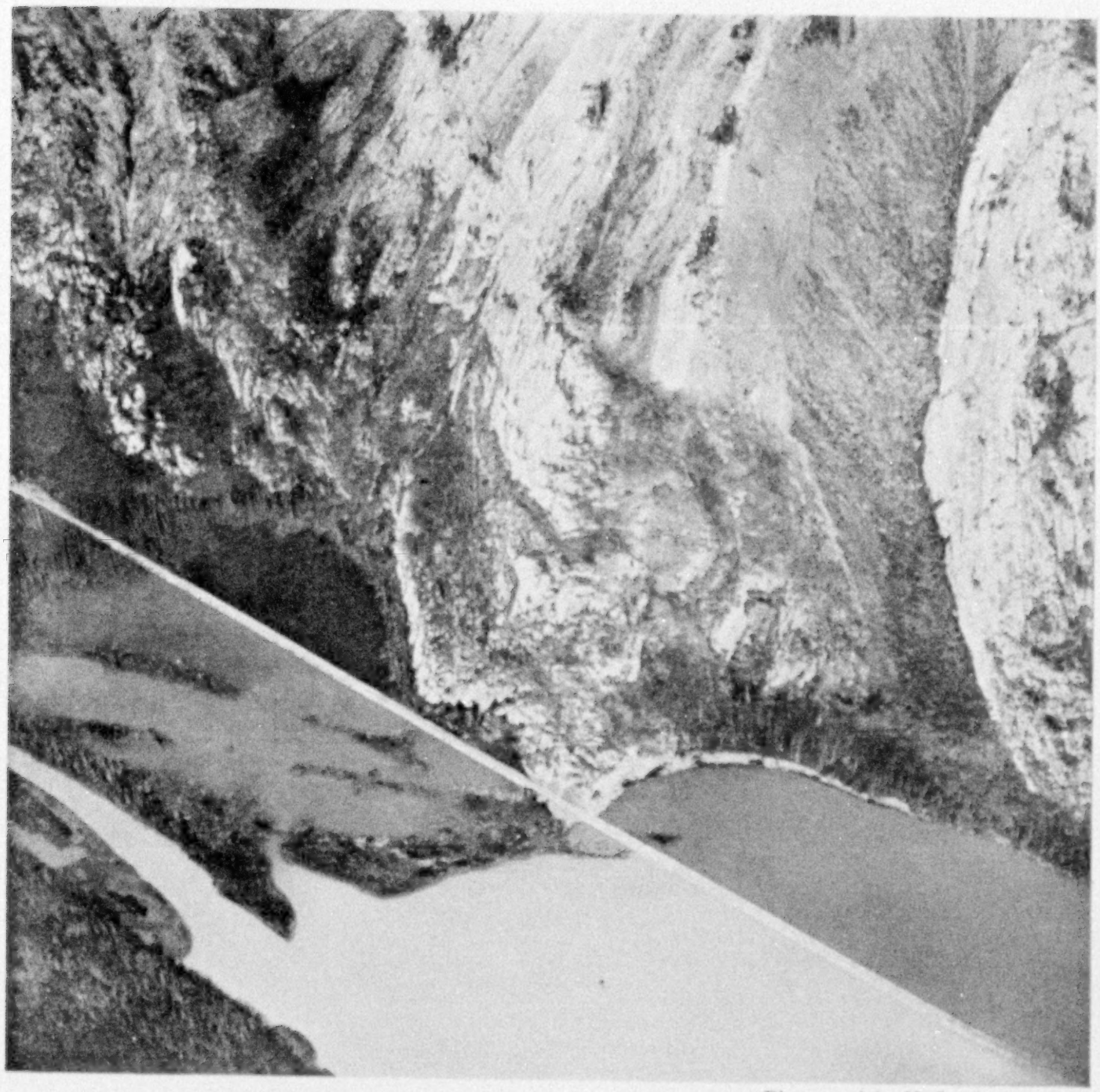
The weather was misty and forbidding. The ground beneath our wings looked inhospitable indeed. Not a square inch of open space appeared in which to land in the event of motor failure.

To add to my apprehension, clouds through which we must pass hung low over the Pembina River; and a mountain range was on the other side of these clouds, if not actually immersed in them.

We deemed it the part of wisdom to go back to Edmonton.

Reluctantly signaling the others to turn, we took back-track for the first time on our expedition since leaving New York.

Upon reaching Edmonton, I communicated with Jasper and found the weather was clear there, though at Edson, half way from Edmonton, fog and low clouds



Photograph by U. S. Air Service

THE CANYON OF THE ATHABASKA RIVER

The straight white line cutting diagonally across the picture is the road-bed of a transcontinental railway.

were reported. We decided to wait until the morrow.

On August 1 we were away at 9:37 in the morning. The wind blew fairly strong from the northwest and the day was bright and clear. As we flew over the Pembina River country I regarded the forbidding nature of the ground below that yesterday had been hidden by the fog. The terrain was rough and rocky. Rivers and streams flowed through deep gorges the sides of which were thickly wooded.

To the right and left, away from the streams, the entire country had been devastated by forest fires. Millions and millions of jack-pine and fir had been burned flat or left with ugly short stumps sticking up to mar the desolate landscape. The employment of a few airplane squadrons in patrolling the forests would have prevented the waste of this valuable timber. From our perch, 2,000 feet above the ground, we could see every point of ground for 30 miles around.

The tiniest column of smoke appearing in all that region would be instantly noted by an observer from the air, and if he could not extinguish the fire himself, he could note its exact location and could

hurry a forester to the rescue within the hour.

Reaching Rocky River, we noticed the foothills giving way to the increasingly high and rugged peaks of the Rocky Mountains proper.

Now, for the first time, snow peaks came into view. A haze had settled over this colder elevation, as the morning sun lifted the moisture from the ravines. The snow-clad mountain tops, shining almost pink in the sunlight, burst suddenly upon our view.

Turning north still more, we picked up the Athabaska River. We passed over the little town of Pocahontas, flying between Jasper Lake and Brides Lake, and swung into the valley of the Athabaska.

THE GRANDEUR OF THE GREAT DIVIDE

The magnificence of the scenery about us was beyond description. One was overawed by the solemn grandeur of the first sight of the Great Divide. We were flying at 6,000 feet over a scene of surpassing grandeur. Below us lay myriads of ghostly gray peaks, colored here and there by verdure and by shafts of sunlight. Scattered among them were crystal lakes so deep in color as to appear artificial. From every side hundreds of gleaming cataracts tumbled down sheer mountain cliffs, dashing and whirling dizzily along their deep-worn canyons until they were all gathered together in the more placid progress of the Athabaska.

Our motors hummed sturdily over this terrible landscape—terrible to the anxious pilot who is constantly straining his eyes to select the site for a forced landing should his motor fail.

As we flew along above the river, the valley widened and we dropped down to 1,000 feet above the river's bed. Ahead of us a gigantic pair of buttresses stood shoulder to shoulder, appearing to resist invasion into the regions beyond. Only the resistless torrents of water, that for centuries had worn deeper and deeper its passage, and the airplane, that scorned all earthly impediments, dared look for an outlet there.

Passing over the crest of one buttress, we gazed ahead. They were sentinels, guarding the valleys beyond; a level plain stretched before us, a plain covered with quaking aspen and jack-pine.

At the north end of this flat valley the Snaring river poured into the Athabasca from the west. Beside the Snaring River lay our landing field.

AIRPLANE A STRANGE SIGHT IN JASPER

Landing was made after a flight of three hours. It was a pleasant surprise to find a splendid field, after all of our apprehensions concerning Jasper. Special efforts had been made to make the runway smooth, under the supervision of Colonel Maynard Rogers, superintendent of Jasper National Park. Colonel Rogers hopes that one day this field will be the headquarters of an airplane squadron of the forest fire patrol of Jasper National Park.

The people of this remote country had never before seen an airplane. The interest and curiosity with which they examined our machines and the variety of questions we were obliged to answer may be imagined.

Colonel Rogers had provided a Chinese cook, abundant supplies, and several tents with pine-boughs bedding for our coming. Aside from the ferocious man-eating mosquitoes which harassed us sorely, we greatly enjoyed our camping out in these wilds. Bears and coyotes are so bold that the residents of Jasper are compelled to lock up their butter and sweets from these midnight prowlers.

We tried swimming and fishing in the mountain creeks, neither of which seemed very satisfactory, as the mosquitoes bit and the fish did not. At 11 o'clock that night, when the cold grew so bitter that even the mosquitoes were numbed, we rolled up in our blankets near the side of the fire to keep warm.

Awake at 6 in the morning, the valley seemed filled with a rosy light, although the sun had not yet risen above the mountain ridges to the east. We were still on the eastern slope of the Great Divide, although from our elevated position on the previous day's flight we could look over the rim and view the other side.

A FIRE SCARE IN THE AIR

As we rose from the ground that morning, after another prodigious meal prepared by the Chinese cook, we circled the town of Jasper at about 4,000 feet and took our photographs before starting on

© Fairchild Aerial Camera Corporation

THE ENTIRE ISLAND OF MANHATTAN AS SEEN FROM AN AIRPLANE 8,000 FEET ABOVE NEW YORK HARBOR

This remarkable photograph was made on a crystal-clear Sunday, with a minimum of smoke from office and manufacturing buildings. The Hudson River is at the left, the East River and its five bridges at the right, and the Harlem River meanders northwestward to the Hudson, in the background.

Photograph by U. S. Air Service

THE HEART OF WASHINGTON, LOOKING EAST FROM THE LINCOLN MEMORIAL

From the Washington Monument, in the central foreground, stretches the Mall to the white group of Capitol, House and Senate Office Buildings, and Library of Congress. At the left is the symmetrical Ellipse, adjacent to the White House and its grounds. The white circle at the extreme left locates the administrative buildings of the National Geographic Society, at 16th and M Streets, four squares north of the White House, and the circle to the east marks The Geographic annex on the railway yard. In the right foreground are the Tidal Basin and Potomac Park Driveway.

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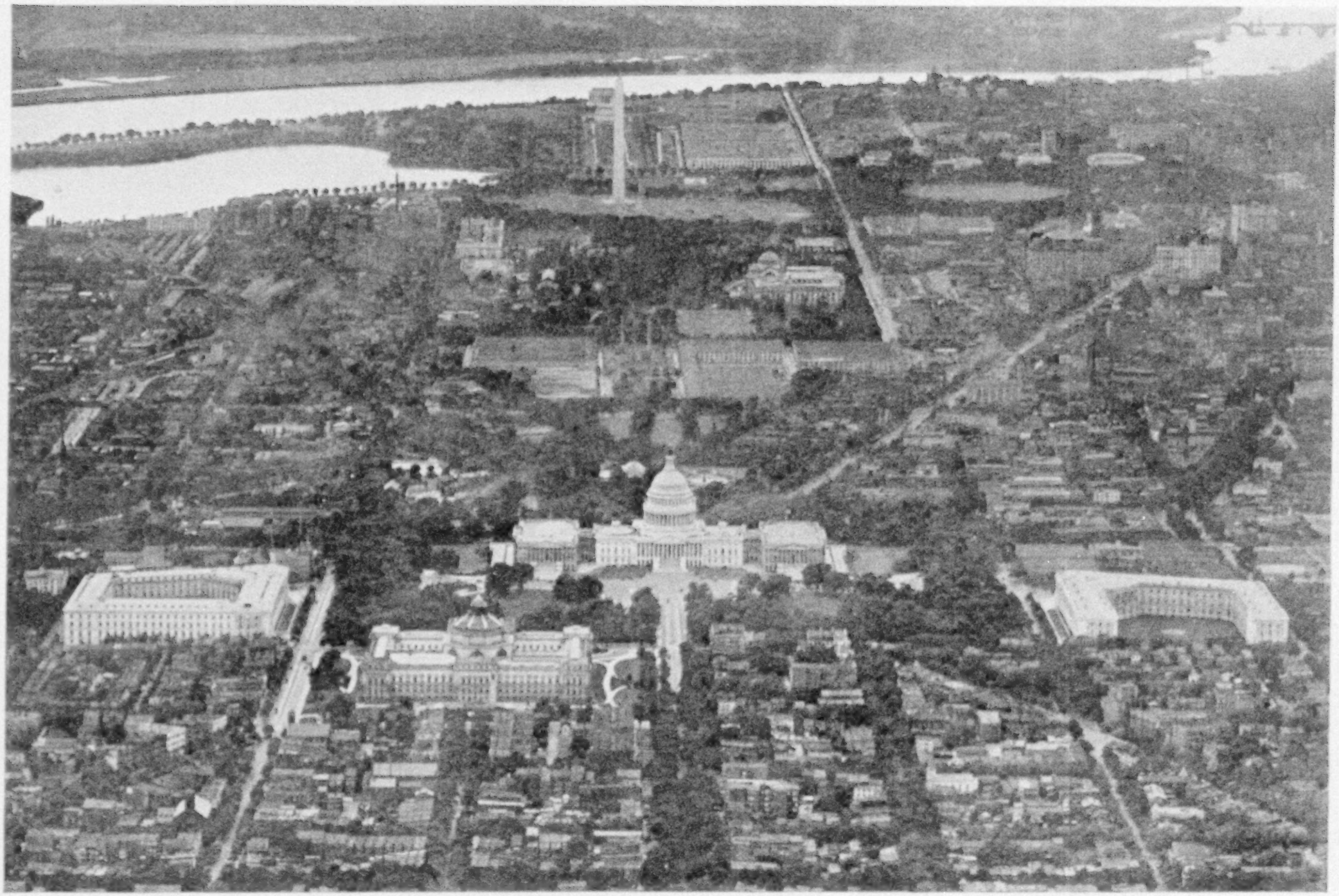
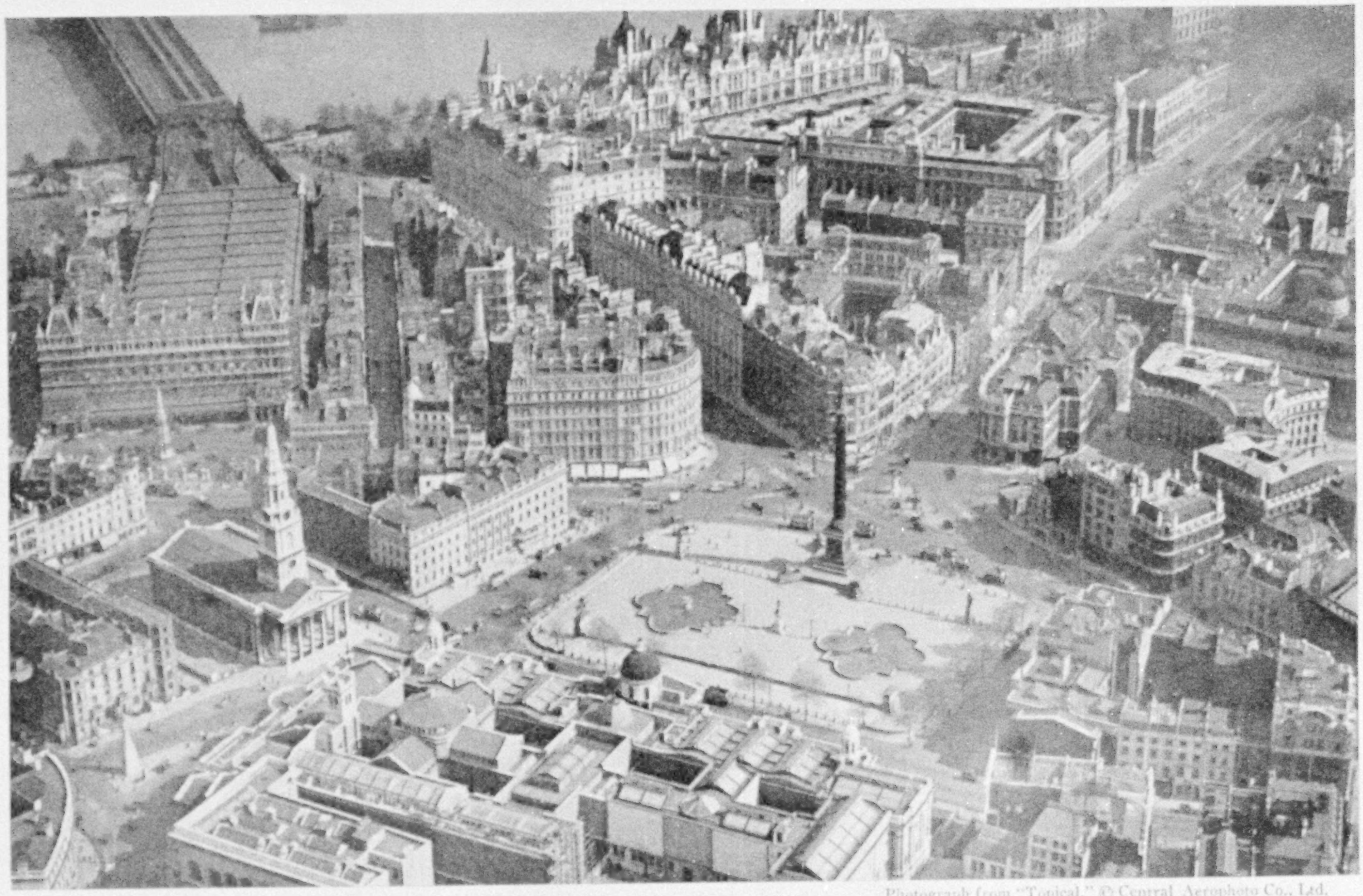


Photograph from U. S. Air Service

THE NATION'S CAPITAL, LOOKING WEST FROM THE CAPITOL GROUNDS

In the immediate foreground is the Library of Congress, with the House Office Building to the left and the Senate Office Building to the right. The domed building midway between the Capitol and the Washington Monument is the New National Museum. In the distance, on the banks of the Potomac, rises in stately grandeur the Lincoln Memorial, which is to be dedicated on Decoration Day this year.



Photograph from "Topical," © Central Aerophoto Co., Ltd.

THE HEART OF LONDON—TRAFALGAR SQUARE AND THE NELSON COLUMN

In the foreground, the building with the roof of jumbled appearance is the National Gallery: at the left rises the spire of St. Martin in the Fields, while behind it (in the left background) is Charing Cross Station, before which stands Charing Cross, in the Strand. Far down Whitehall, the building with the hollow square is the War Office. In the upper left corner is the Charing Cross Bridge across the Thames.

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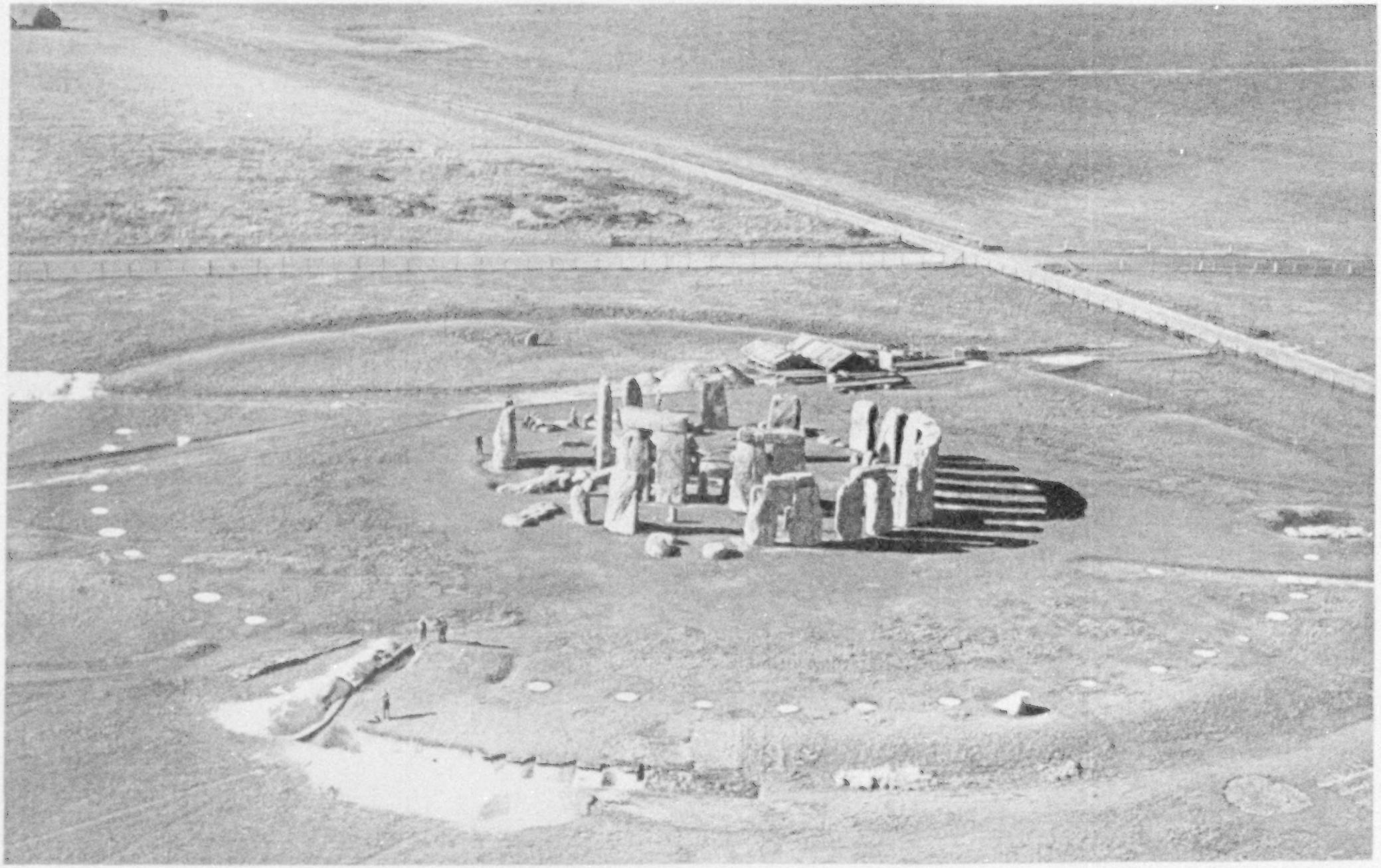
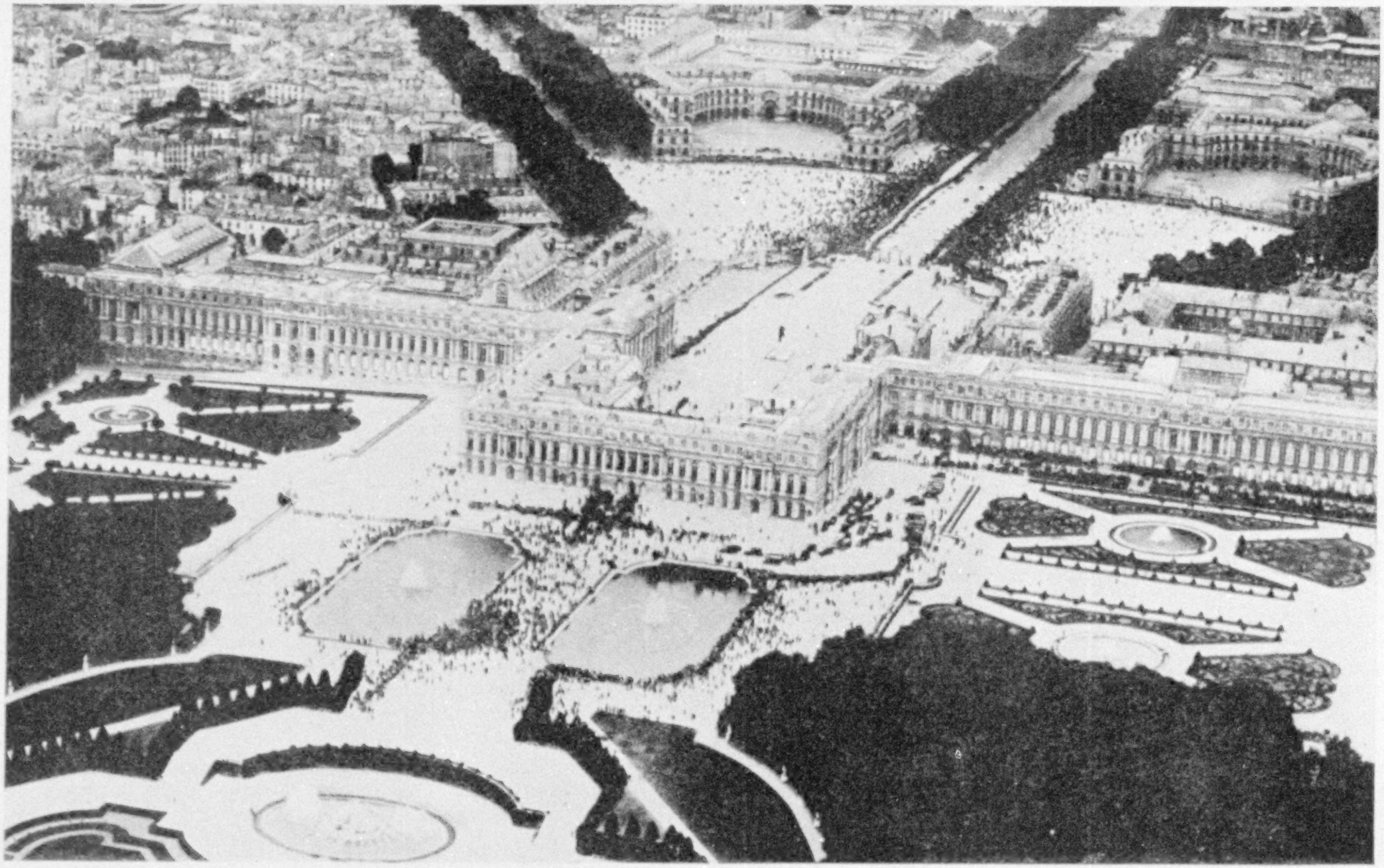


Photograph from "Topical," © Central Aerophoto Co., Ltd.

MONUMENTS OF THE PREHISTORIC PAST: STONEHENGE, WILTSHIRE, ENGLAND

An airplane view of the most imposing relic of a forgotten people in the British Isles. The mysterious stones stand in the center of Salisbury Plain and have been variously attributed to the Phœnicians, the Belgæ, the Druids, the Saxons, and the Danes. Myths of the middle ages credited the monuments to the magic of Merlin, who was supposed to have transported the circle from Ireland, whence, previously, giants had carried it from Africa.



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THE PALACE OF VERSAILLES IMMEDIATELY AFTER THE SIGNING OF THE PEACE TREATY

Note the delegates to the Peace Conference, grouped at the entrance to be photographed; the motors at the side of the palace, and the crowd on Paris Avenue, in front of the building.

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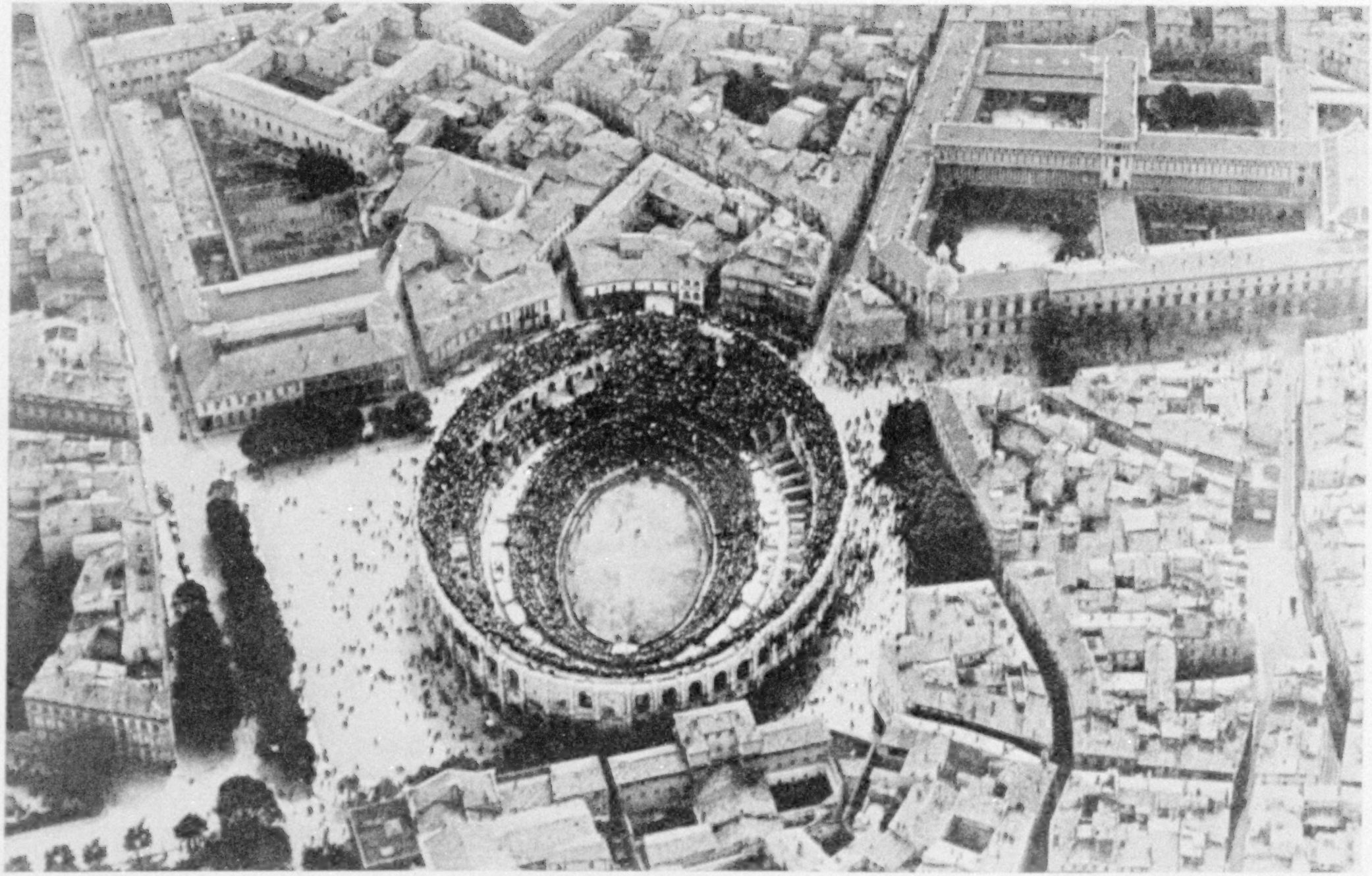

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THE ROMAN ARENA AT NIMES, FRANCE, DURING A BULL-FIGHT

In this airplane view thousands of people are shown crowding the passageways in an attempt to gain entrance into the already-thronged arena, where formerly gladiatorial combats were staged. This is the best-preserved amphitheater in France and dates from the first or second century of the Christian era

Photograph from The London Electrotype Agency, Ltd.

GIBRALTAR FROM THE AIR

Recognized throughout the world as the symbol of military impregnability, Gibraltar presents an interesting study from an elevation of several thousand feet. Guide books inform the reader that "foreigners are never allowed to see over the fortifications, to take photographs, or make drawings near the fortifications."

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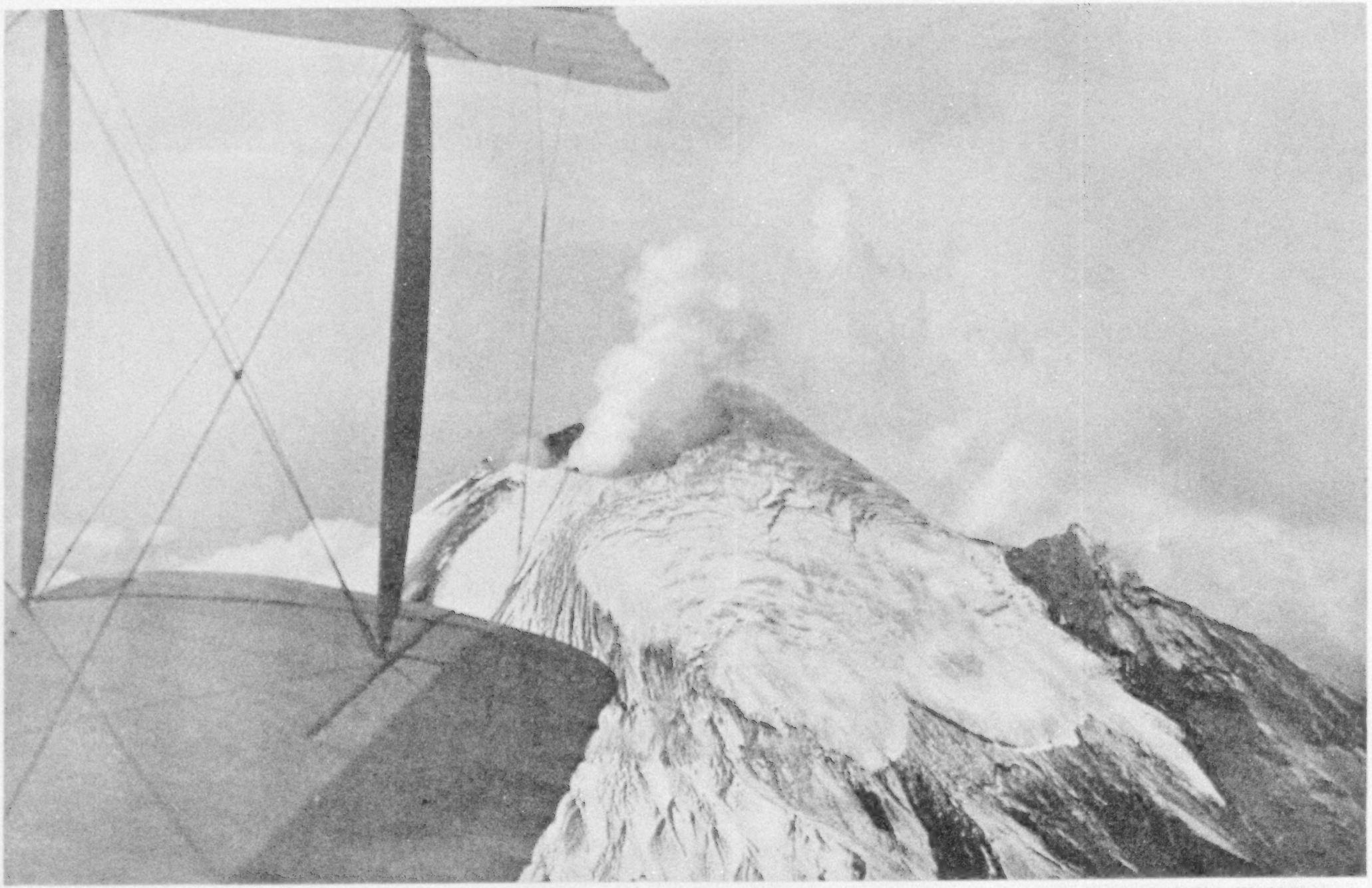


© Wide World Photos

THE SMOKING CONE OF POPOCATEPETL, MEXICO'S MOST FAMOUS VOLCANO

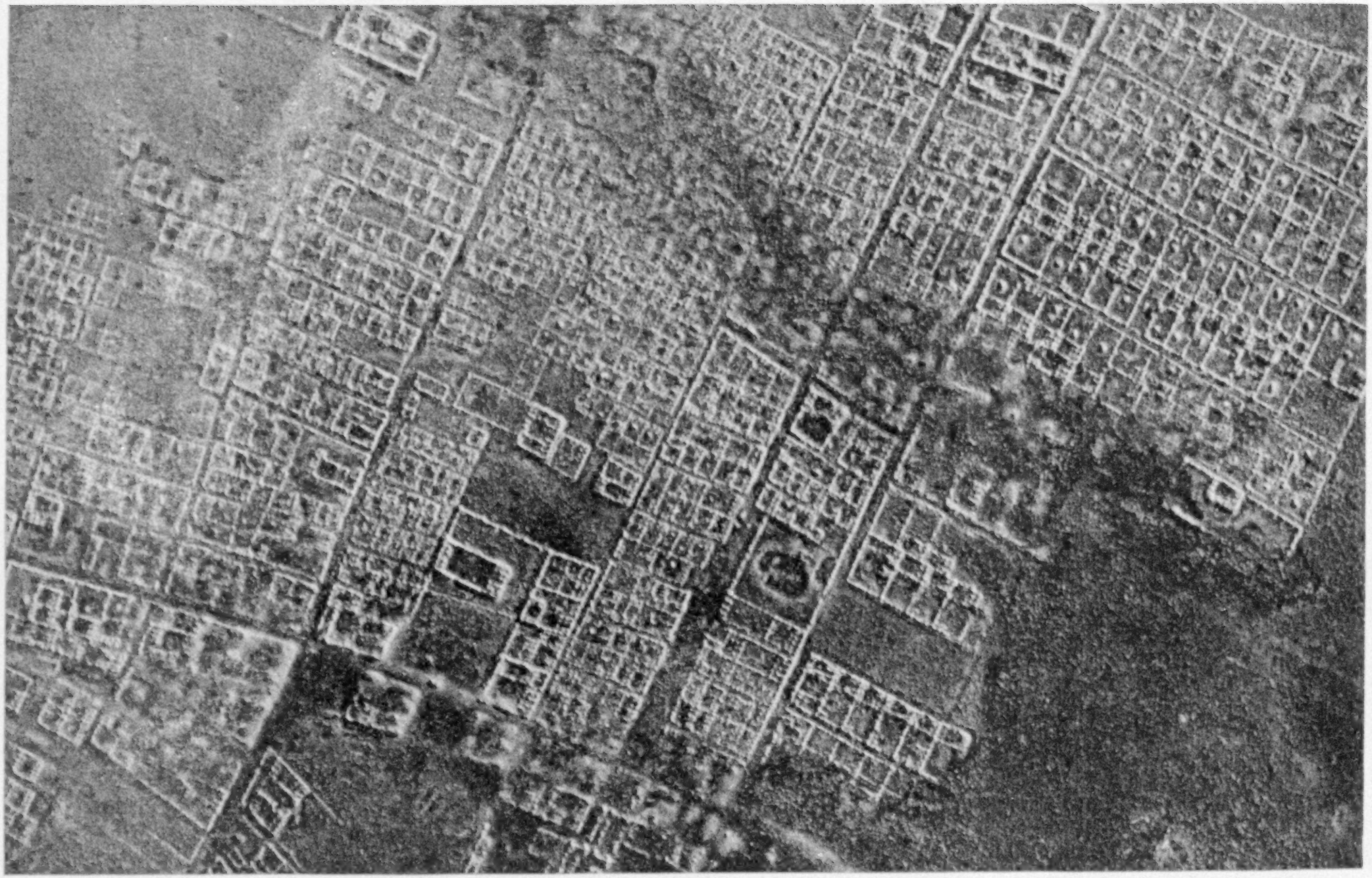
Rising to a height of nearly 18,000 feet, this snow-covered mountain is one of the most majestic peaks of the Western Hemisphere. It is a valuable sulphur mine. The Indians employed in gathering the sulphur fill their sacks with the substance and then slide down the snow slopes.

Photograph from Albert T. Clay

THE RUINED MOSQUE AND SPIRAL TOWER OF SAMARRA, ON THE TIGRIS

The mosque was built in the ninth century, when the Caliphate was moved from Bagdad to this site. The walls of the ancient mosque and traces of ruins about it can scarcely be recognized, except from an airplane. (See also the illustration on the opposite page.)

XUM



Photograph from Albert T. Clay

THE SQUARES, STREETS, LANES, AND BUILDINGS OF ANCIENT SAMARRA, VIEWED FROM THE AIR

Once the magnificent residence of the Caliph, extending for twenty miles along the banks of the historic Tigris, Samarra is now a mere shadow of its former greatness, with a population of barely 2,500. So completely do the ruins melt into the landscape that a traveler might pass within a few miles of the once throbbing metropolis without being aware of its proximity.

Photograph by H. Bregault

THE FIRST AIRPLANE LANDING NEAR THE SUMMIT OF MONT BLANC

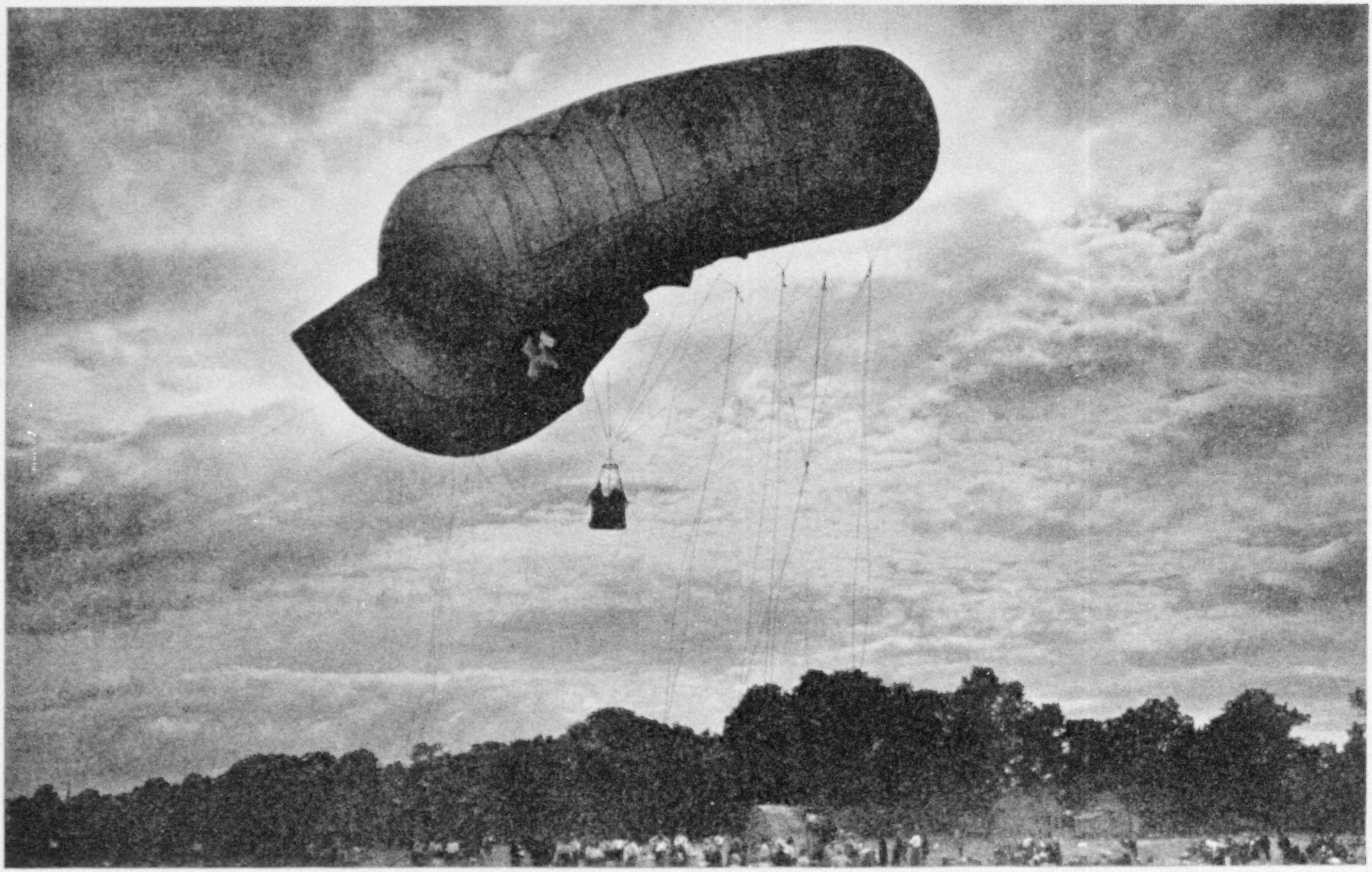
The photograph was taken at the precise moment when the aviator, Durafour, touched the snow of the Col du Dome after having passed over a large crevasse.

The photograph was taken at the precise moment when the aviator, Durafour, touched the snow of the Col du Dome after having passed over a large crevasse.

Photograph by Ad Astra-Aéro Aviation Suisse S. A.

A HYDROPLANE AMONG THE SWISS ALPS

In the vicinity of Karpfstock (9,000 feet), the Richetli Pass (7,425 feet), Hausstock (10,340 feet), and Sardona Pass (9,315 feet).



Photograph by Jean Gaberell

HAULING DOWN A SWISS CAPTIVE BALLOON AT DAYLIGHT

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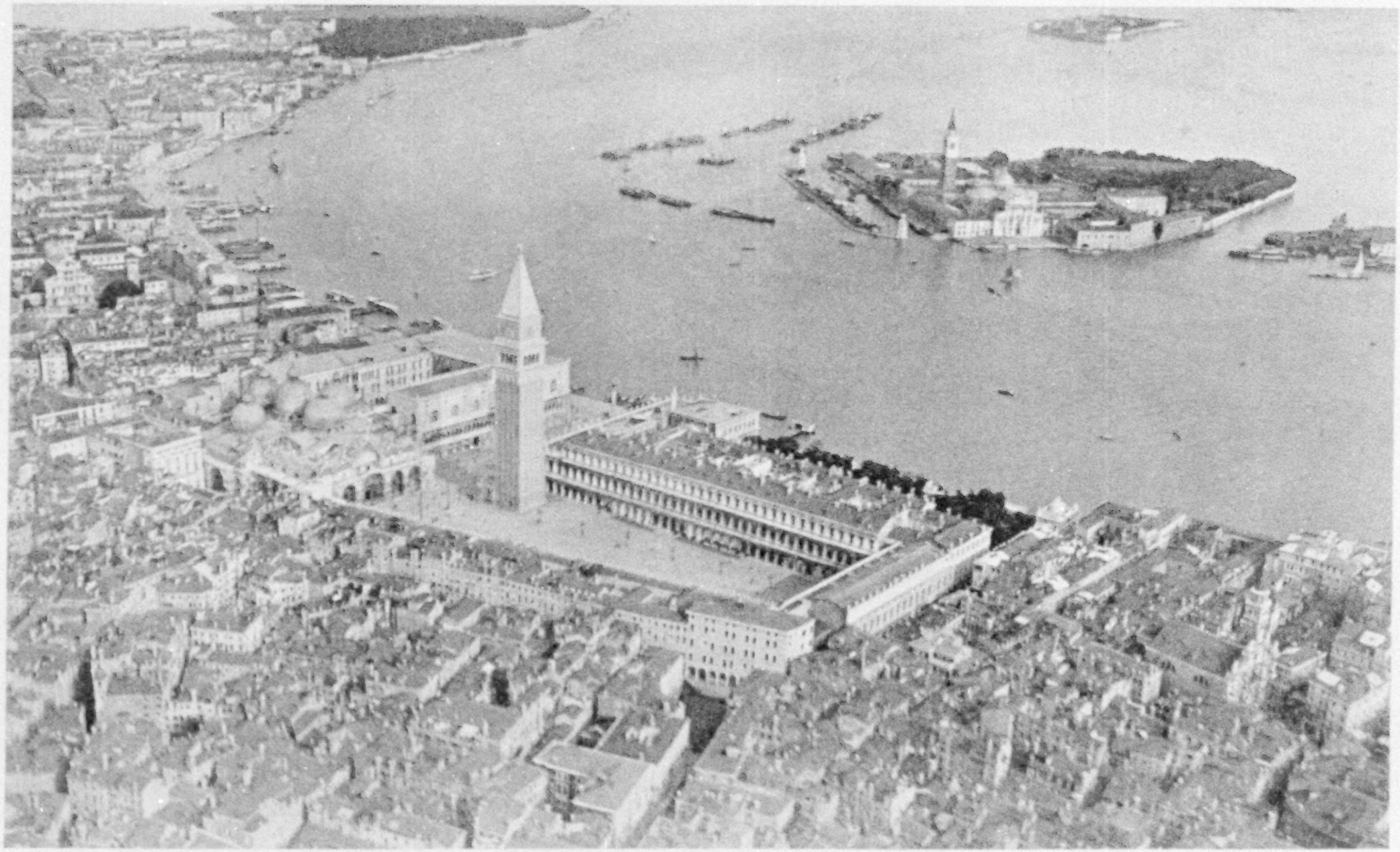
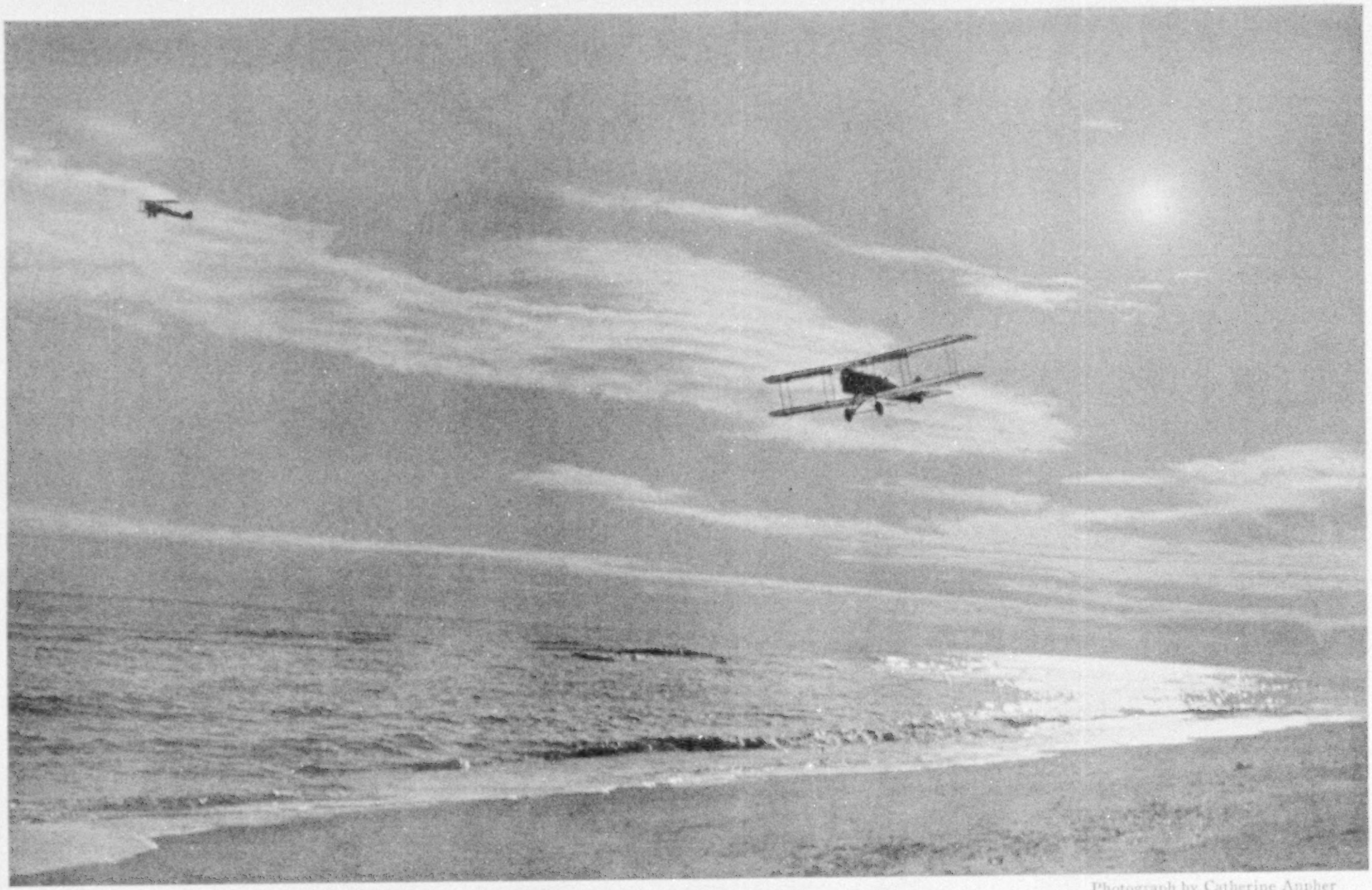


Photograph by Capt. Louis Brullard

VENETIAN LANDMARKS FROM THE AIR

The world-traveler recognizes in this photograph many familiar sights—the poly-domed Cathedral of St. Mark, before which rises the Campanile; the Piazza of St. Mark; the Doges' Palace, with its double tier of columns, and in the background the island of San Giorgio Maggiore and its domed church.



Photograph by Catherine Anpher

THE FIRST ALASKAN AIR EXPEDITION ARRIVING AT NOME

The expedition was conceived by Brigadier General William Mitchell, Assistant Chief of the U. S. Air Service and during the St. Mihiel offensive Commander-in-chief of the Allied Air Service in France, whose interest in such an undertaking was first awakened while he was serving as a junior officer of the Signal Corps in the construction of the Government Alaskan Telegraph Line.

our way. Just as we were leaving the town on our course to Prince George, I noticed great quantities of smoke issuing from the rear end of my motor. Believing I was on fire, I side-slipped instantly; then, turning the controls of the machine over to Sergeant Henriques, I seized the fire-extinguisher, left my seat, and crawled forward to get a shot at the flames. A shower of oil from the engine had covered the wings and struts. They were so slippery with oil I could not get far enough out to use the extinguisher.

I frantically signaled Henriques to head for the river, crawled back into my cockpit, and prayed for the intervention of Providence. Providence replied in the nick of time to save us from a ducking. At about 200 feet above the water the smoke suddenly ceased. For the fraction of a second I waited for more smoke to follow. None came.

I seized the controls, righted the machine, and made back over the field, skimming the tree-tops for the landing field and mosquitoes and Chinese cook. The others, following their orders, had continued on their way to Prince George.

The fault was discovered to be in cold oil which had caused some back pressure in the tank, causing an overflow on hot exhaust pipes. Making everything secure again, we took off for the second time shortly after 1 o'clock, the sky in the meantime becoming overcast with storm clouds.

Along the valley of the Miette we were carried forward by a favoring wind. The lovely snow-capped mountain, recently named Mt. Edith Cavell, towered above us. Myriads of small lakes were visible, as we climbed higher, cradled between ridges and mountains covered with snow. We were fast approaching the crest of the Great Divide.

We passed directly over Lake Lucerne, a remarkable little body of water which lies on the very top of the Divide. In fact, the east end of Lake Lucerne drains into the Miette, while the west end flows into a tributary of the Fraser River and eventually reaches the Pacific Ocean.

OVER THE GREAT DIVIDE

In spite of all my precautions, we ran the gantlet of two or three snow- and rain-storms before reaching the Yellowhead Pass, through which our route led us to the western side of the Divide.

Yellowhead Pass is, perhaps, the lowest pass in the Rocky Mountains. It lies only 3,400 feet above sea-level. We cleared the rocks and bushes by less than 1,000 feet, noting on each side the actual dividing crests that permitted one rivulet of snow water to begin its flow to the Atlantic, while another was sent to swell the tides of the Pacific.

Down the valley of the Fraser as far as Urling, a spot upon my map, we hastened at 110 miles per hour. We were going down the western slope. We had crossed the Canadian Rockies.

A SOFT RIVER FOR EMERGENCY!

While a forced landing in this wilderness, so remote from human habitation, was the constant thought which had weighed upon my spirits each day since starting from New York, now that the crossing was actually accomplished. We flew along with the blithest unconcern. Here was a soft river below us, which would do if the emergency came.

Both sides of us the atmosphere was filled with the smoke of forest fires. Deep growths of Douglas fir, spruce, and pine covered these magnificent mountains. I noticed with much surprise that the smell of the burning spruce was plainly discernible at my altitude of 8,000 feet, fully 4,000 feet above the edge of the timberline below.

Never have I felt so alone in the midst of a gorgeous universe. Snow-capped mountains formed a complete circle about us. Other mountains were green and seemed to be flat on top. Evidently a lichen growth covered these mountain meadows.

I searched intently for some signs of caribou and moose on these flat mountain tops over which we made our roaring way, but not a living thing stirred. Events were forming ahead, however, which might prove extremely interesting. A wall of blackness, streaked with occasional flashes of vivid lightning, loomed ahead of us. Amid these mountain peaks, even in the short period of our flying over them, storms seemed to gather and then disappear with incredible swiftness. The winds changed frequently, now with us and now against us.

XUM

Photograph from H. R. Charlton

"THE LOVELY SNOW-CAPPED MOUNTAIN RECENTLY NAMED MT. EDITH CAVELL TOWERED ABOVE US"

This peak of the Great Divide, rising to a height of more than 11,000 feet, perpetuates the memory of the English nurse who was executed in Belgium during the World War. In the foreground is Lake Cavell.

While still three-quarters of an hour away from Prince George, as I estimated our position, I was compelled to enter the blackness of the storm. Rain and occasional hail beat us down closely under cover. For fear of being blown completely off my course, I determined to drop down near enough to the ground to check up any drift to the north or south.

For fully ten minutes we were immersed in partial darkness. I remember yet how I watched the lightning dart from the bottom of the clouds straight into the ground.

The first glimpse I had of terra firma was a cliff, not below me, but ahead of me! I zoomed up and over the rocks by a good 100 feet, then dropped down again to within a 100 feet of the tree-tops. I feared I might pass directly over Prince George without seeing it.

And indeed this nearly happened. It was raining very hard and I could scarcely distinguish the ground. I felt that we must have reached the town, and so I turned back, and there, to my great relief, I saw houses and a road.

Back and forth over the settlement we flew, trying to get the directions so as to locate the way to the field that had been selected for our landing. Finally a blaze of light on the ground to my right indicated that a flare had been lighted to guide me. Flying low, I observed the three airplanes of my flight huddled together in the blinding rain, while around them was grouped a number of motor cars. Later I learned that I had flown over the spot several times without seeing my comrades.

A BLIND LANDING—A SMASHED WING

I made a blind landing. As luck would have it, I hit the edge of the field and smashed my left wing and tore away the whole side of the stabilizer. Ten feet more to the right would have given me an open path. However, Henriques and I were quite satisfied to step out of the damaged machine and find ourselves surrounded by friends.

The other ships had arrived without injury with the exception of Lieutenant Crumrine, who blew a tire and nicked his propeller in making a landing. His mechanic, Sergeant Long, was riding on the tail of the machine, to make it stop rolling after landing, when the airplane nosed up and threw him headlong. Fortunately he was unhurt.

Pilots and crews unanimously voted the Prince George field to be the worst, with the exception of the Erie field, that we had yet visited.

The officials and the citizens of Prince George treated us royally and gave us every assistance in making our repairs. We found a cabinet-maker in town and we gave him the job of splicing the torn panels and spars of my machine's wing. The fabric was not badly torn. Our greatest concern was to find a suitable substance to take the place of the dope needed to shrink and coat the new linen covering on the wing and stabilizer. Lieutenant Kirkpatrick finally concocted a solution from banana oil and gun-cotton which seemed to prove quite a good substitute.

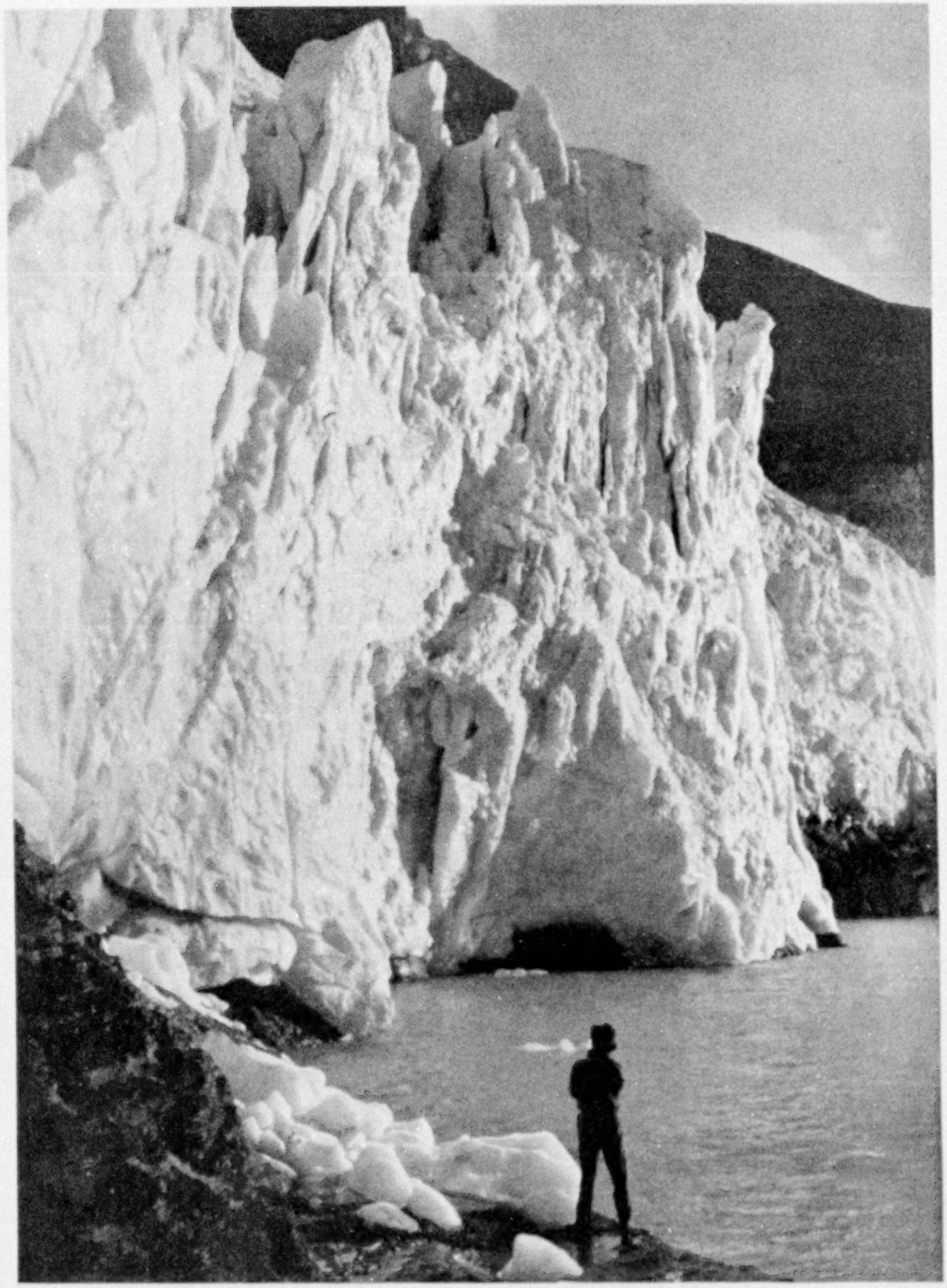
All hands turned in valiantly to salvage the damaged panel. We pressed into service a local tailor to repair the linen fabric; each machine had brought along spare linen for this very purpose. In the meantime Lieutenant Nutt was sent ahead to inspect our next landing field at Hazleton, so that we might avoid a repetition of this mishap.

Although Prince George is only 500 miles from the coast, we found few people there who had ever seen an airplane. A railroad connects the town with the outside world, yet its facilities are poor and the vast natural resources of this region still remain practically untapped. The country is inhabited by intelligent men, all of whom were quick to relate the advantages of their town and the vicinity.

Lieutenant Nutt returned with the disquieting intelligence that he was sure no airplane could land safely at Hazleton. He had examined the field prepared for us and had scoured the country for a better site, with only indifferent success, reporting a site then in oats which if cleared might serve. I took the train next morning to make a personal investigation. We were indeed now in the very heart of our trouble. It was no longer a question of occasional landing fields to be used for emergency landings, but a vital one of being able to come down at all when our fuel gave out.

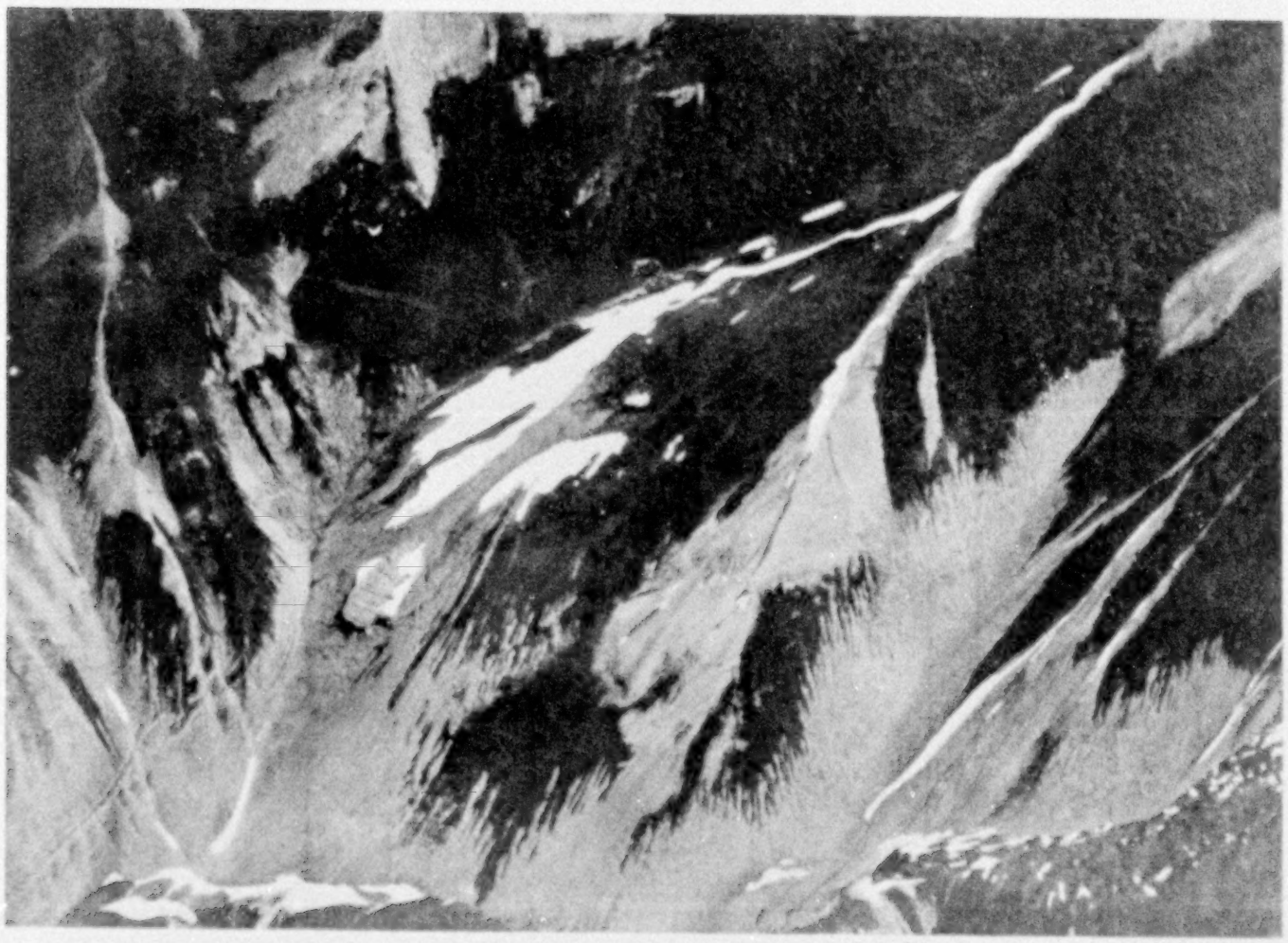
Leaving the train at Hazleton station,

Belgium during the World War. In the foreground is Lake Cavell.



TUMBLING GLACIER, MT. ROBSON, BRITISH COLUMBIA

Robson peak, which attains an elevation of more than 13,000 feet, lies to the north of Yellowhead Pass, while Mt. Edith Cavell is to the south.



Photograph by U. S. Air Service

THE ROCKY MOUNTAINS AT 8,000 FEET, FROM THE SOUTH AND WEST, AFTER CLEARING YELLOWHEAD PASS (SEE TEXT, PAGE 537)

a mile or two from the town, I procured a Ford car and a guide and proceeded to scour the countryside for miles around. The roads were execrable. Bottomless gorges and steep mountain slopes covered with timber were threaded by trails leading to small clearings made by the Indians, or occasionally the pasture lot of a white man.

REAPING AN OAT CROP TO MAKE A LANDING FIELD

The only field approaching adequate size for our purpose was the farm of a Mr. Bierns, which was the site originally suggested for our use and recommended by Lieutenant Nutt. But this I found covered with three feet of standing oats! Another tour of the country convinced me that we must either land on Mr. Bierns' oat-field or else turn back.

Accordingly, I called to see Mr. Bierns and explained the situation to him. To my surprise and gratification, he immediately offered to cut a runway through the oats, and furthermore declared he would roll the runway until it became firm enough to give us a smooth surface.

Leaving details in his hands, I hastened back to Prince George, where I found all necessary repairs had been completed.

On August 13, after a delay of eight days, we left Prince George at 9 o'clock in the morning, and after a flight of 3½ hours we landed in the Bierns oat-field without accident.

Across this most forbidding landscape we bucked against a thirty-mile wind. The reputation of the Liberty motor can never again be immoderately criticised within our hearing, for we most certainly owed our lives and the subsequent success of our expedition to our motors' fidelity that day.

Over twisting mountain gorges filled with rushing torrents, over forests of standing timber, over mountain ranges and peaks, we flew with anxious eyes, seeking an inviting spot on which to land, should our engines cease their labors. Our imaginations caught frightful sounds from the motors' roaring. Only when

Photograph by A. E. Preble

A GROUP OF INDIAN WOMEN ON THE YUKON WATCHING THE ARRIVAL OF PIONEER AIRMEN

Photograph by U. S. Air Service

THE FOUR PLANES IN AN OAT-FIELD AT HAZELTON, BRITISH COLUMBIA
(SEE TEXT, PAGE 543)

In the foreground is a typical miner, with his four pack-horses, heading south into the Roche de Boule Range.

Photograph by U. S. Air Service

THE LANDING FIELD AT WHITE HORSE, YUKON TERRITORY

The people of White Horse evinced extraordinary interest in aviation and were eager to discuss the possibility of using airplanes for transportation of passengers and freight in winter, when the temperature drops to 70 degrees below zero in this region.

the landing fields appeared did this nightmare vanish.

SPECTATORS MADE TO SERVE AS A STEAM ROLLER

Mr. Bierns had done his best to roll his field to a hard surface for us, but we found that the airplanes would not leave the field until the surface was packed harder still.

The advent next day of an army of sightseers, including mountaineers in heavy boots and Indians in moccasins, who assembled to see us off, gave us an idea. We marched this army up and down the runway most of the forenoon. This exercise, together with the rays of the sun, gave us a reasonably dry stretch, about 300 yards long, on which to gain speed enough for a take off.

The Indians did not seem to relish this method of white man's transportation overmuch, particularly the walking up and down for hours before leaving. One dusky visitor paused in his exertions, came to me, and said: "You heap smart man, but heap d— fool."

At 1:30 we decided upon a start. All the machines got away safely, although with great difficulty. We rose to 6,000 feet and headed northwest for Wrangell. Soon we were compelled to climb to 10,000 feet, for the country beneath us was bad to look upon from the standpoint of an airman.

Our maps were inadequate and many inaccuracies were noted. Huge glaciers and rugged declivities loomed gigantic and fearsome in the clear atmosphere. The sun shone fiercely upon the snow-covered ranges and the glare fairly blinded us. It was impossible for me to see the instruments on the dash-board after having faced this glare for some time.

The odd noises coming from the roaring motors made our hearts quail. There was not even a body of water within sight upon which an airplane could come to even a wet landing. For nearly two hours we flew over this No Man's Land. Under other circumstances the scenery might have been full of wonder for us.

A WELCOME SIGHT FOR SNOW-BLINDED EYES

We recognized the Nash River, partly from our maps and partly from the descriptions given us at our last stop. Then came the Stewart arm and we knew that Alaska was now in sight.

Just south of Stewart we dropped down to 5,000 feet and found that the village nestled at the base of an almost sheer cliff which mounted a full 5,000 feet into the air. The few buildings there were indeed a sight welcome to snow-blinded eyes, and the fact that we were again above American soil thrilled us momentarily.

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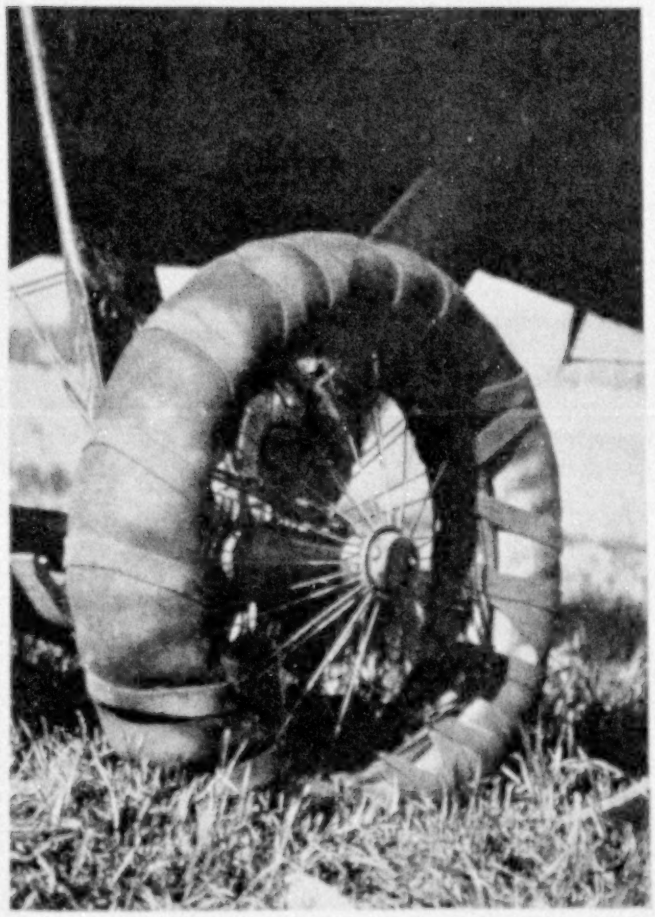


A CHILD OF NECESSITY

Bursting a tire while taking off at White Horse, Lieutenant Crumrine wound a rope round the rim of his wheel and placed the tire casing over this. With his plane thus equipped, he "roared in and landed grandly at Dawson" (see text, page 547).

The thrill was only momentary, for the next glance ahead disclosed more glaciers and more "scenery," which summoned a thrill that shook out of our minds all thought of home. The glaciers reminded me vaguely of the man-eating mosquitoes of Jasper; probably because they were irritating rather than dangerous.

Across the fjordlike arm of Stewart Canal, over Bohn Canal; then, ten minutes later, Bradford Canal, all really deep inlets of the sea, we flew, and then we sighted Wrangell Island and Wrangell, the town, due north. A smudge had been lighted to guide us to the field, and this we sighted when 10 miles away.

LANDING IN TIDE-WATER

Then followed one of the most curious experiences of the trip. The field appeared to be excellent from the air. We all watched Lieutenant Kirkpatrick make his landing, hoping to benefit our own by his example. What looked like a quantity of sand flew up before his wheels when they touched the ground.

Descending in our turns, we found that in reality we were landing in a bed of salt marsh grass immersed in over a foot of water in places. The field was inundated at high tide. Our hosts had neglected to mention these circumstances, which is just as well, because this field was the only available site in that section, and landing in that amount of water is more disconcerting than dangerous.

Later we learned that Wrangell was at that moment experiencing the highest tide it had known that summer, a tide of 19 feet! We realized instantly upon landing that it was high enough to give airplanes and occupants a thorough drenching.

We were removed from Sergief Island, after our ships were put in readiness for the next day's flight, to the island of Wrangell, seven miles distant. Many of the people of the town, including the good mayor, accompanied us in the one boat to Wrangell, where we were to attend a dance given in our honor.

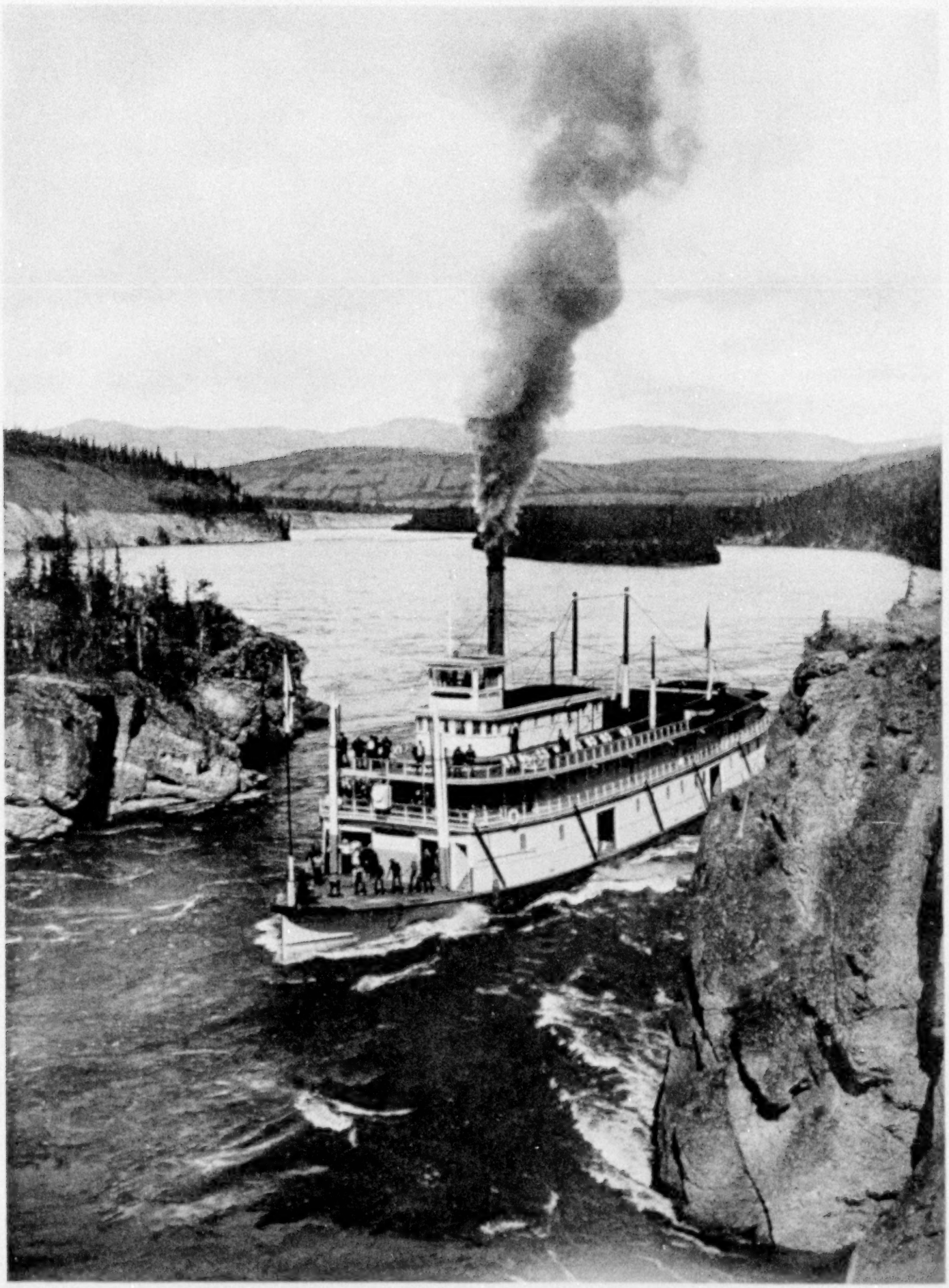
Due, I presume, to the weight of our load, the overburdened boat stuck on a sand-bar and remained there for an hour and a half before we reached Wrangell, where we were banqueted by the mayor. We excused ourselves early that night and were shown to our bedrooms.

Remaining over two days at Wrangell, three of the flight got away on August 16, while I was compelled to remain behind to repair a propeller I had nicked in starting.

White Horse was our next objective. Leaving the next morning at 8 o'clock with a 10-mile-an-hour wind on my tail, I flew low over Stikine River, past the Taku Glacier and above Juneau.

Clouds hung low that morning and we were forced to fly under 1,000 feet all the way. Past Haynes, the White Pass seemed to be actually immersed in the clouds. Upon reaching the pass, I found scarcely 100 feet clear air between its crest and the clouds. Through this gap we flew; thence straight on to White Horse. My companions had all arrived safely before me and were in readiness to proceed to Dawson.

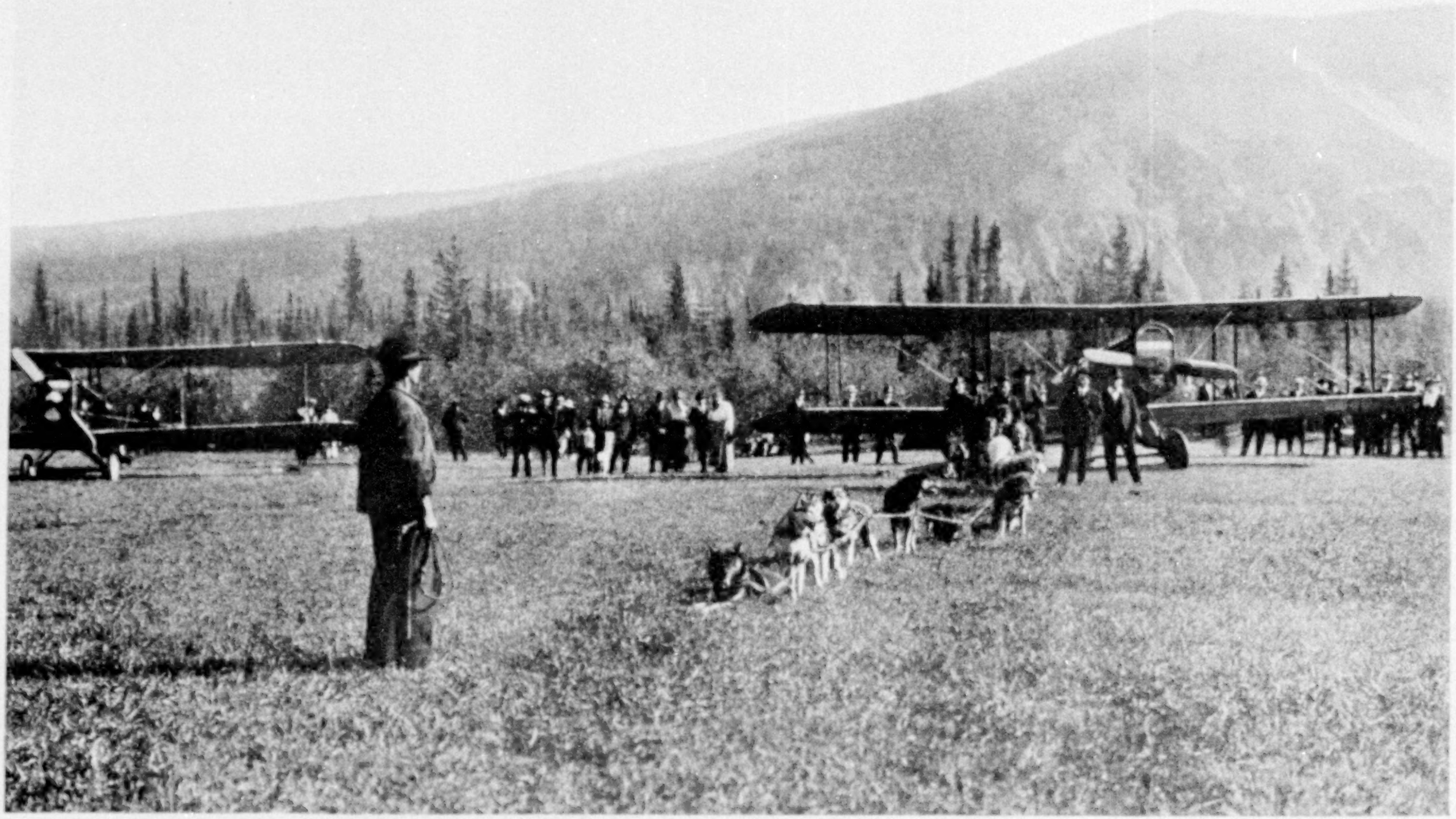
The people of White Horse were very enthusiastic over aviation, although the



© Hamacher and Doody

THE STEAMER "WHITE HORSE" IN FIVE-FINGER RAPIDS

The most forbidding section of the entire air route lay between White Horse and Dawson, the topography being ribbed and gashed in ages past by a mighty glacier.



Photograph by Frank Lowe

THE ANCIENT AND THE MODERN METHOD OF TRAVEL IN THE NORTH

The planes made the trip from White Horse to Dawson in one hour and thirty-five minutes; the dog team would have required thirty days.

great bulk of them had never before seen an airplane. Many were the questions put to us concerning the use of aircraft in transporting freight and passengers into this difficult country.

In replying to these questions it occurred to me that, before airplanes could be judged entirely fitted for work in these chill skies, experiments should be carried out to determine how aëronautical engines would function at the extremely low temperatures experienced in this country during the winter months.

ONE OF THE MOST FORBIDDING ROUTES EVER TRAVERSED BY AIRPLANE

And, as I was to discover on the morrow, the country between White Horse and Carmacks, on the route to Dawson, is as rugged and forbidding as any ever traversed by airplane. The entire country is bare rock, formerly the bed of a great glacier, which has receded and left the topography ribbed and gashed in its passing. Landing an airplane anywhere in this region would be practically impossible.

From an elevation of 7,000 feet, this country seems to have been dug up by a gigantic plow, the furrows running north and south.

From Carmacks to Selkirk the country became less rough, until finally, at the Yukon Crossing, just above Five Finger Rapids, the river valley broadened out and occasional sites for landing fields were to be seen.

From Selkirk to Stewart one follows above the White Horse Trail to the Stewart River, and above this river to the Yukon.

All this trip I made alone on the morning of August 18. Two of the machines flew away from White Horse at 5 o'clock on the preceding evening.

Lieutenant Crumrine, who was the third man to start, blew a tire and was forced to stop and make repairs. I waited with him to make repairs. Again we prepared to take off, and this time I was first up. While I was circling about, watching Crumrine taxi down the course, I saw his tire burst again. Again he stopped before leaving the ground. I went on without him, and thus it was that I, and later Crumrine, too, flew alone over this desolate stretch.

Flying low over the river's course from Stewart to Dawson, I arrived over that historic little city almost without being seen. Crumrine would not be able to overtake us until he could procure a new tire from Wrangell, a matter of several days; so I thought; but shortly after my arrival Crumrine roared in and landed grandly on one good wheel and one improvised wheel of rope. He had simply wound a rope around the rim of his wheel and placed the casing over that (see page 544).

ARRIVING IN DAWSON

Space forbids recounting the courtesies and entertainment extended to us by the people of Dawson. Everything possible was done for our comfort and pleasure.

Dawson now is but a remnant of its former splendor. In its days of glory its population numbered 40,000. Now it has shrunk to not more than 2,000, including whites and natives.

After dinner we were taken out on the Klondike River, where we viewed the operations of the huge placer dredges. The whole Klondike Valley is now being worked by dredges and is said to be paying at approximately 35 cents per yard.

Caribou and moose furnish the majority of the meat for this community. Great hunting parties are formed during August and September, which are counted upon to provide meat enough to last over the winter months.

Ice-boxes are unnecessary in Dawson. Six feet below ground, cellars are built which preserve an ideal temperature for cold storage.

We were requested to keep a lookout for a herd of caribou reported to be in the neighborhood. It was a great disappointment to us that we were unable to make a special expedition to locate this herd for our newly made friends.

The next morning, August 19, we were off at an early hour for Fairbanks. Here spares and supplies were awaiting us. But our machines had stood up wonderfully so far, and, with the exception of a new wheel for Lieutenant Crumerine and one or two other minor parts, we were in need of nothing.

GREAT EXCITEMENT AT FAIRBANKS

Great was the excitement at Fairbanks when we arrived. We had become so ac-

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Photograph by the Rev. G. F. Horwarth

DAWSON, A SHRUNKEN CITY WITH A SPECTACULAR PAST

In the days of its glory it had a population of 40,000; today only 2,000 whites and natives make this their home.

Photograph by Frank Lowe

THE FOUR AIRPLANES OF THE ALASKAN FLIGHT AT DAWSON, YUKON TERRITORY

READY FOR THE FINAL LAP OF THE NEW YORK TO NOME FLIGHT

The sand-bar shown in the picture is six miles east of Ruby. So eager were the Indians to see the airplanes that they flocked into Ruby days before the arrival of the expedition, and their demands upon the community's larder threatened to bring about a famine.

Photographs by U. S. Air Service

A METROPOLIS ON THE YUKON: RUBY, ALASKA

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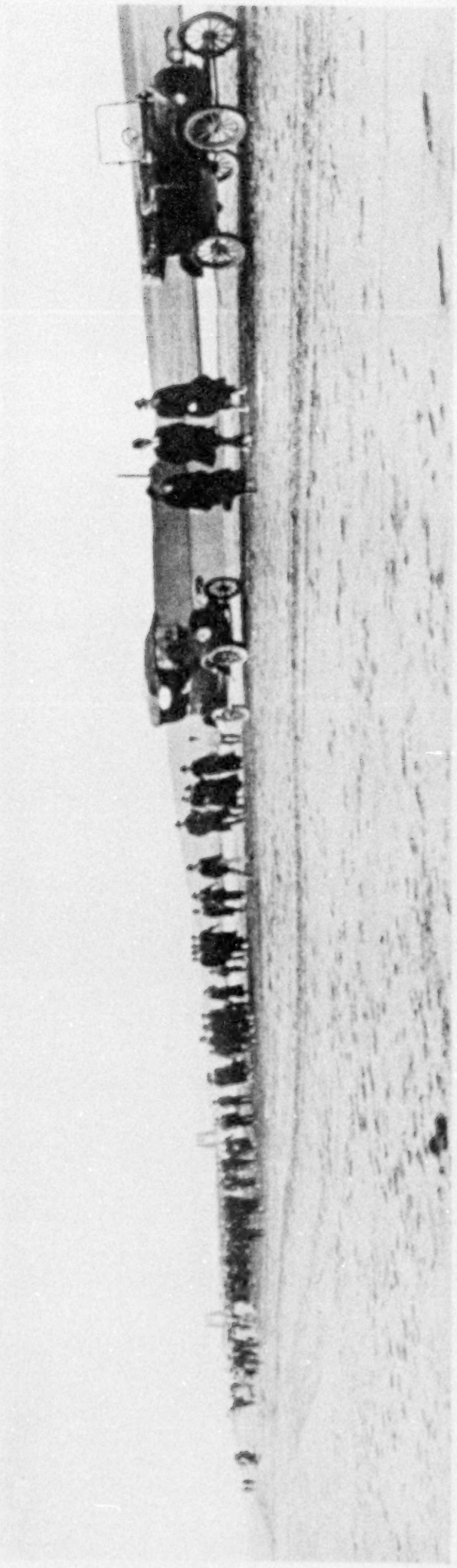

"ALL NOME CAME OUT TO GREET US"

Photograph from Capt. St. Clair Streett

customed to the great crowds that gathered to meet us that we took it as a matter of course. The very evident amazement of the old "sour-dough" settlers of Fairbanks, however, persuaded us that aviation would have some backers in the future, once they had fully grasped its meaning.

They could not believe that we had covered the distance from New York in 50 hours, when they had spent 18 or 20 months reaching there by way of the Yukon, in the gold-rush days. Letters we bore to them from New York and the East they declared they would keep always as souvenirs of our visit.

Fairbanks and the Tanana Valley were surprising to us by reason of the green verdure, the abundant crops, and beautiful flower gardens that bloomed luxuriantly in contrast with the bleak and forbidding country over which we had so recently flown. Here enterprising farmers took every advantage of the few weeks of sunlight in the spring and their crops grew with great rapidity. Every house boasted a well-kept garden.

Unlimited resources remain undisturbed here in interior Alaska. Not gold alone, but copper, silver, lead, coal, and tin are found in seeming abundance. Cinnabar, too, has recently been discovered in this region.

As we flew up the Tanana toward the Yukon, two days later, we saw much of this interesting country from a low altitude. Though few landing places were available, we felt a nonchalant disregard for the precautions that had worried us so much in the Canadian Rockies. Sandbars in the river appeared now and then.

Our maps, which were Geological Survey maps of the Tanana and Yukon valleys, proved to be accurate.

We flew through light rains until Harpers Bend was reached, south of Fort Gibbon, on the Tanana River, and then we entered the valley of the Yukon.

We overtook a river-boat on the Yukon and were tempted to fly down close enough to get a view of the passengers. The contrast between this method of transportation and our own was striking, for the boat was pushing three barges against the current and was not making more than three or four miles an hour.

XUM

Photograph by U. S. Air Service

THE PERSONNEL OF THE ALASKAN EXPEDITION AFTER ITS RETURN TO WASHINGTON, D. C.

Captain Howard T. Douglas (see text, page 552), Lieutenant C. C. Nutt, Lieutenant E. H. Nelson, Lieutenant C. E. Crumrine, Lieutenant Ross C. Kirkpatrick, Sergeant James D. Long, and Sergeant Joseph English. The Flight Commander (Captain Streett) is not shown.

© Lomen Brothers

HOMEWARD BOUND FROM NOME

Captain Howard T. Douglas, who had personally made most of the arrangements for our landings ahead of us, was awaiting us when we landed at Ruby. He informed us that the Indians had been gathering for days to greet us. In fact, so great had been the demand on the Ruby larder and so universally had the fishing been abandoned by these Indians that our expedition threatened to bring a famine to the community.

For a week before our arrival all the mining camps and fishermen's nets had been abandoned. When we came in sight squaws dropped their papooses and raced the men to the river to see us land.

Captain Douglas had cleared a small island some six miles from the town, and here we landed without accident, after a flight of two and three-quarters hours from Fairbanks. One more such flight would bring us to the end of our journey.

This last short hop was made on the afternoon of August 24, when we settled down near Nome, on the old parade ground of Fort Davis, situated between the Nome River and Bering Sea.

We had flown just 53 hours and 30 minutes from New York, covering 4,500 miles, without mishap or any breakage of serious character. The air route had provided a passage over country impassable by any other means.

After we had delivered our mail to the delighted recipients and had put up our airplanes for the night, we were carried into the city of Nome at the head of a great procession. We were banqueted by the American Legion members, then attended a reception given by the Arctic Brotherhood, where we were presented with a loving cup and with many other beautiful gifts.

One more short flight of 150 miles would have taken us to the continent of Asia, but this was not on the program.

After a few days rest we retraced our course, bearing with us photographs and maps of value to the government. On October 20 we landed safely on Mitchel Field, New York, completing the round trip of 9,000 miles in just 112 hours of flying, with the same airplanes, the same motors, and the same spark-plugs.

Some day this trip may be made overnight—who knows?

THE STORY OF THE RUHR

By Frederick Simpich

Author of "The Rise of the New Arab Nation," "Along Our Side of the Mexican Border," "Every-day Life in Afghanistan," "The Geography of Our Foreign Trade," etc., in the National Geographic Magazine

IT is a phenomenon of history—due, perhaps, to geographic influences—that, century after century, great human dramas are often staged on the same map spots. Thus the passes of northwest India, the plains of Babylonia, the valley of the Nile—what famous theaters they have been in the great wars of the world!

And the Rhine! Long ago Hugo said of it, "For thirty centuries it has seen the forms and reflected the shadows of almost every warrior who has tilled the Old World with that tool they call the sword." Cæsar, Attila, Charlemagne, Napoleon, Barbarossa, Bismarck, Hindenberg, Foch, Haig, Pershing—all have passed this way.

Down the Rhine, below where Cæsar bridged it at Andernach, below where Yankee doughboys now wash their shirts in its green flood and British Tommies play at soccer above the bones of bishops, a small crooked stream flows in from the east—a stream called the Ruhr. Merely as a river, this Ruhr, barely 150 miles long, is not important. But it flows through and lends its name to a tiny region not equaled anywhere for intensity of industry and potential political importance.

Viewed in the light of events since the war, it seems safe to predict that the course of life in Europe for the next generation may depend on what is happening now along this short, crooked, but busy stream.

"A MERE SPECK ON THE MAP"

The Ruhr, as this famous region is commonly called, is not a political subdivision of Germany; it is merely an industrial district, smaller in area than Rhode Island, but crowded with mines and factories from end to end and settled, in spots, with 1,800 people to the square mile.

Tiny as it is, a mere speck on the map, it produces in normal times over 100,000,000 tons of coal a year; it mines much of the iron ore its many mills consume, and the steel wares of Solingen have been famous since the middle ages.

From Essen there is trundled out, month after month, a parade of finished engines, cars, and farm implements, to say nothing of tools, shafting, ship-frames, bridge steel, and plates, that compete in the markets of the world from Java to Jerusalem.

One German writer, with characteristic racial precision, figures out that the volume of raw and finished products handled in the Ruhr every working day would load a train of cars thirty miles long!

To grasp quickly just what the Ruhr would look like if painted in on a map, take your pencil and draw a horseshoe-shaped figure, starting northeast from Duisburg, on the Rhine; then curve east and southeast, so that Dortmund stands at the toe of the shoe; thence south to Hagen, southwest to Barmen, and thence straight on to strike the Rhine again at a point north of Cologne (see map, p. 554).

Then think of the Pennsylvania coal-fields packed into this tiny area; pour in the combined populations of Philadelphia, Baltimore, Cleveland, and St. Louis. Then take a flock of the biggest American steel mills and railroad shops you can think of and set them down along the Ruhr. Fill in the remaining smaller gaps with paper, silk, and cotton mills, glass factories, tanneries, dye, chemical, and salt works. Now put every man, woman, and child from the cities named hard at work digging coal, firing boilers, running lathes, or rolling steel rails, and you will get a graphic, accurate mental picture of what this roaring, rushing Ruhr really is.

Geographically, the Ruhr district lies chiefly in the province of Westphalia, bounded on the west by the Rhine. A small section of its area, however, including the city of Essen, flows over into the Rhine Province. Physically, it forms a part of the great sandy plain of north-

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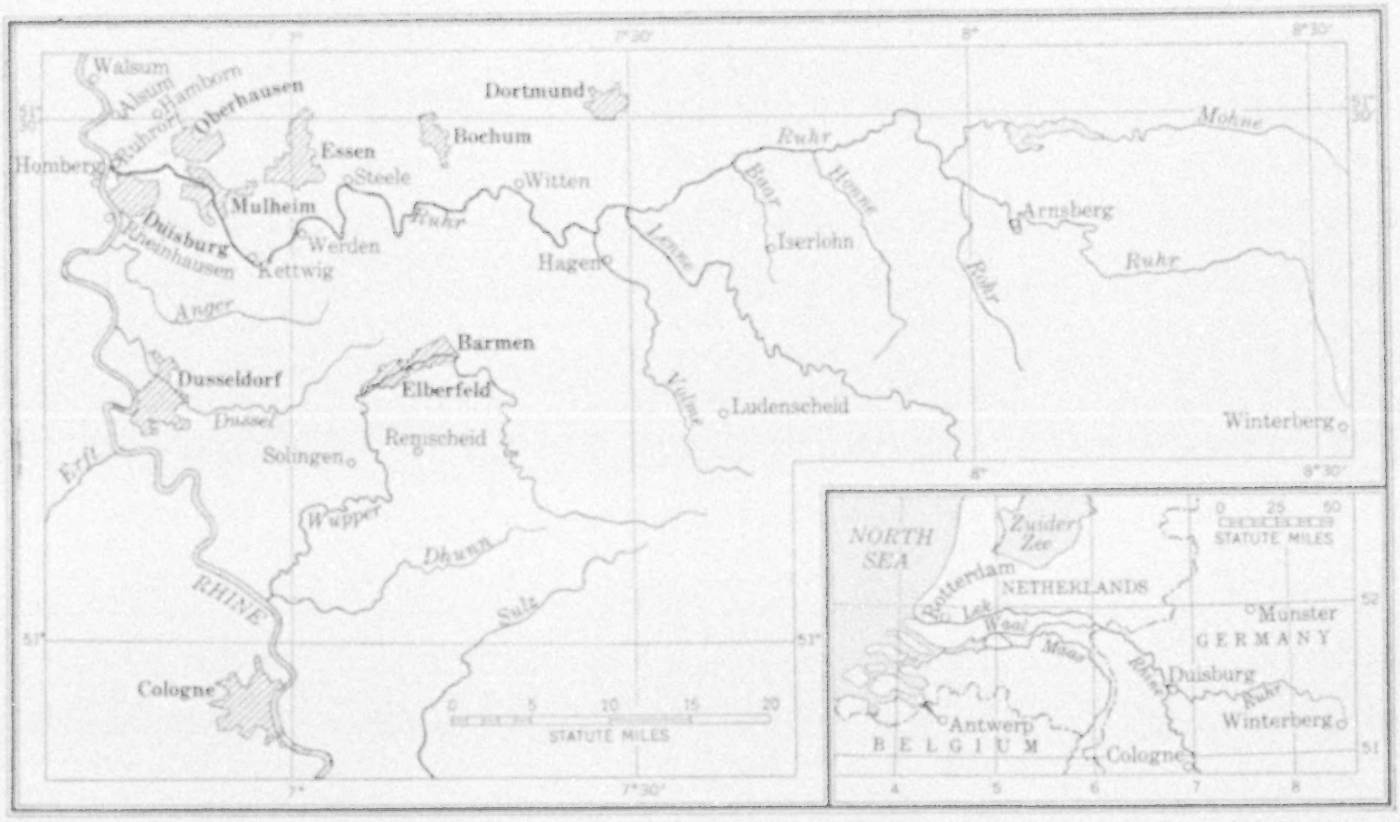

Drawn by James M. Darley

A SKETCH MAP OF THE RUHR BASIN

west Germany, merging with what geologists call the "Gulf of Cologne." Its climate is mildly oceanic, with the heaviest rainfall in July.

A SOLID PROCESSION OF BUSY TOWNS

Plunging suddenly into this teeming industrial field on the train ride from Cologne to Berlin, and passing through Dusseldorf, where 150 trains a day puff in and out, you are amazed at the solid procession of busy towns, at the almost endless forest of chimneys, and the pall of somber smoke that hangs over the flat, unattractive country.

In this small but highly mineralized region, where men have dug coal for 600 years, over 400 concerns now operate mines or hold concessions for their exploitation. And the Ruhr industrial region is even larger than the mining area, for it overflows to the southwest and includes the famous factory towns of Barmen, Elberfeld, and Solingen.

This whole Ruhr region, its myriad whistles screeching like a vast fleet lost in a fog, shrouded in smoke by day and lit by furnace flares at night, its forest of gaunt chimneys splitting the sky like the trunks of giant dead trees, forms a powerful picture of humming human activity.

Workmen you see everywhere—hundreds, thousands of them—busy as ants; and deep down in the bowels of earth, half a mile down or deeper, thousands more are working, stark naked, in the stifling heat and dust of the mines, delving for the coal that all Europe needs. A distinct and clannish class these pale, short-lived miners are, an hereditary social group wherein son follows father and takes pride in his calling.

So thickly do the mines crowd each other that a mining map, with round black dots to show the pits, looks at first glimpse oddly as if a charge of bird-shot had been fired at it. Viewed from an airplane, the whole highly developed region, with its tangled net of waterways, railways, and tram lines, forms a quaint pattern, like that the fishworms make crawling over flat mud spots after a hard rain.

And over all the towns, always, hangs the smoke, drifting sometimes close to earth, like the fogs that roll in at San Francisco.

THE STORY OF THE KRUPP BOOM

"Boom" towns of mushroom growth are not peculiar to America, as the startling rise of Essen plainly proves. Though founded away back in the ninth century,

Photograph from Frederick Simpich

ELECTRIC WELDING IN ESSEN

it slumbered along for hundreds of years, an obscure, unimportant hamlet. Even as late as 1850 it had hardly more than 10,000 people. Then the Krupp boom—the rise of the greatest machine-shop the world has ever seen—struck it, and today the city houses half a million.

Set in the heart of the coal-fields, crowded with endless industrial plants whose tall chimneys belch eternal smoke and fumes, the great workshop fairly throbs with power and energy. The roar and rattle of ceaseless wheels and the din of giant hammers pounding on metal seem to keep the whole town atremble.

Here every form of iron and steel article is made, from boys' skates to giant marine engine shafts. Curiously enough, even some of the smoke, or the fumes from the smokestacks, is caught and converted into a gas that furnishes more power to run the mills!

And to the 80,000 or more men on his pay-roll, the name of Krupp is above that of kings.* And indeed no industrial enterprise anywhere has ever shown a more astonishing development, reflected more dramatically the result of human concentration, or achieved a wider notoriety among the nations of the world.

More than a hundred years ago the first Krupp set up his small, crude shop and began to make by hand the tools, the drills and chisels, used by tanners, blacksmiths, and carpenters along the Ruhr and the Rhine. He also made dies for use in the mint of the government. Within 30 years, due to the old ambition for expansion, Krupp tools were known and used as far away as Greece and India.

*At the death of Friedrich Alfred Krupp, the last of his line, the factories passed into the possession of his daughter Bertha. In 1906 she married Dr. Gustav von Bohlen und Halbach, formerly a counselor of embassy, to whom the government granted permission to assume for himself and heirs the name of Krupp in conjunction with his own.

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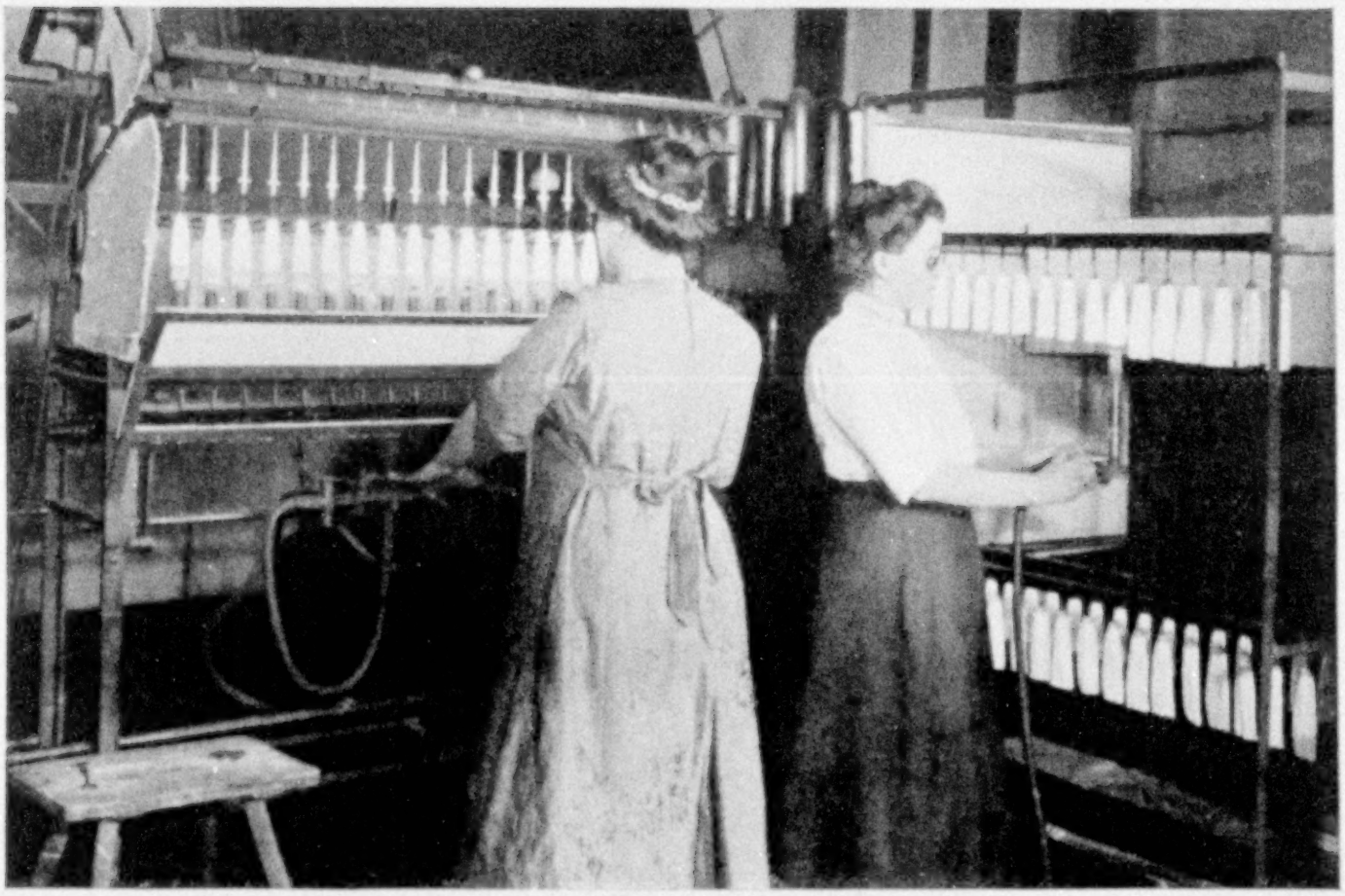
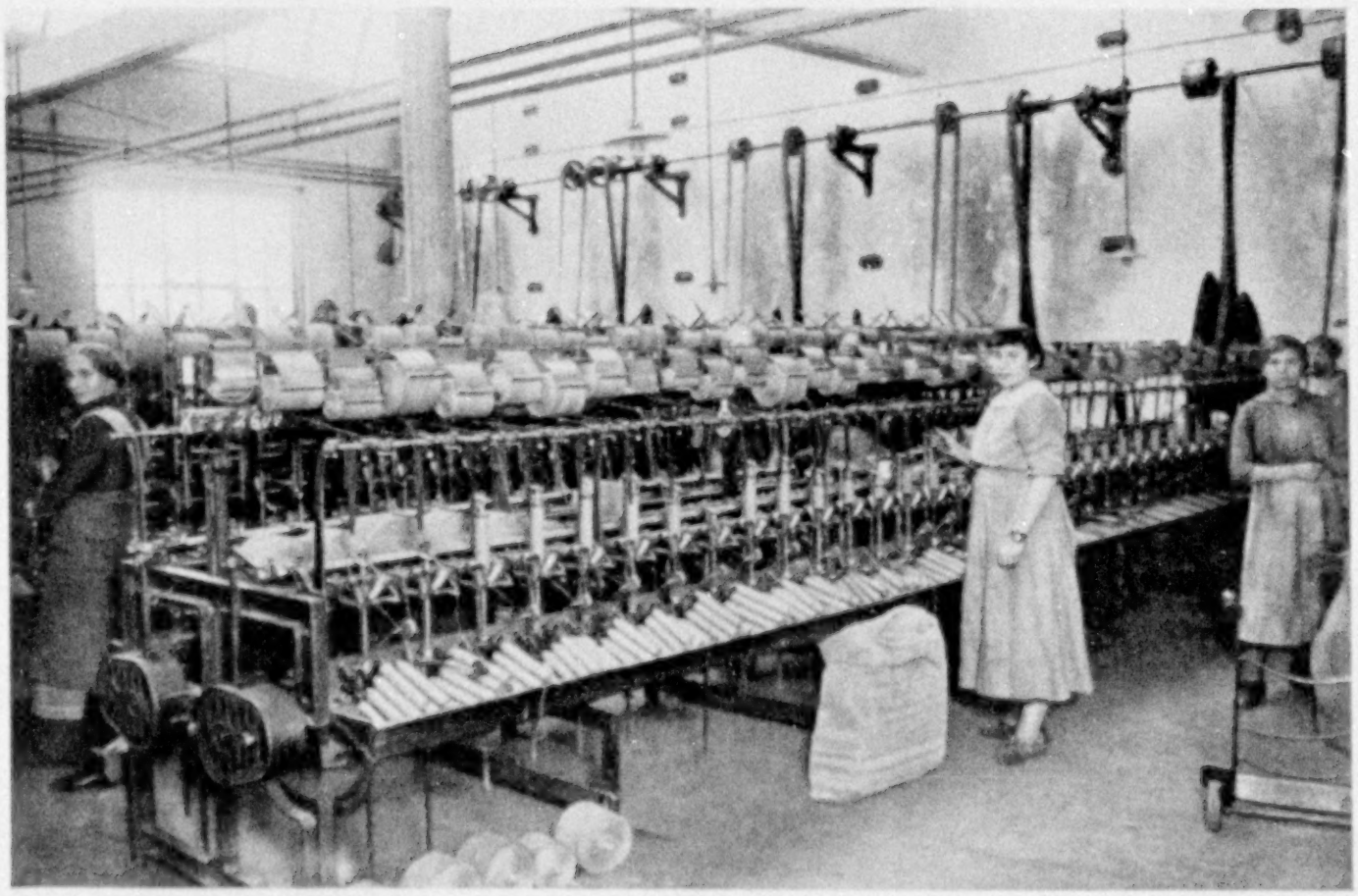


MAKING GAS MANTLES IN A RUHR FACTORY

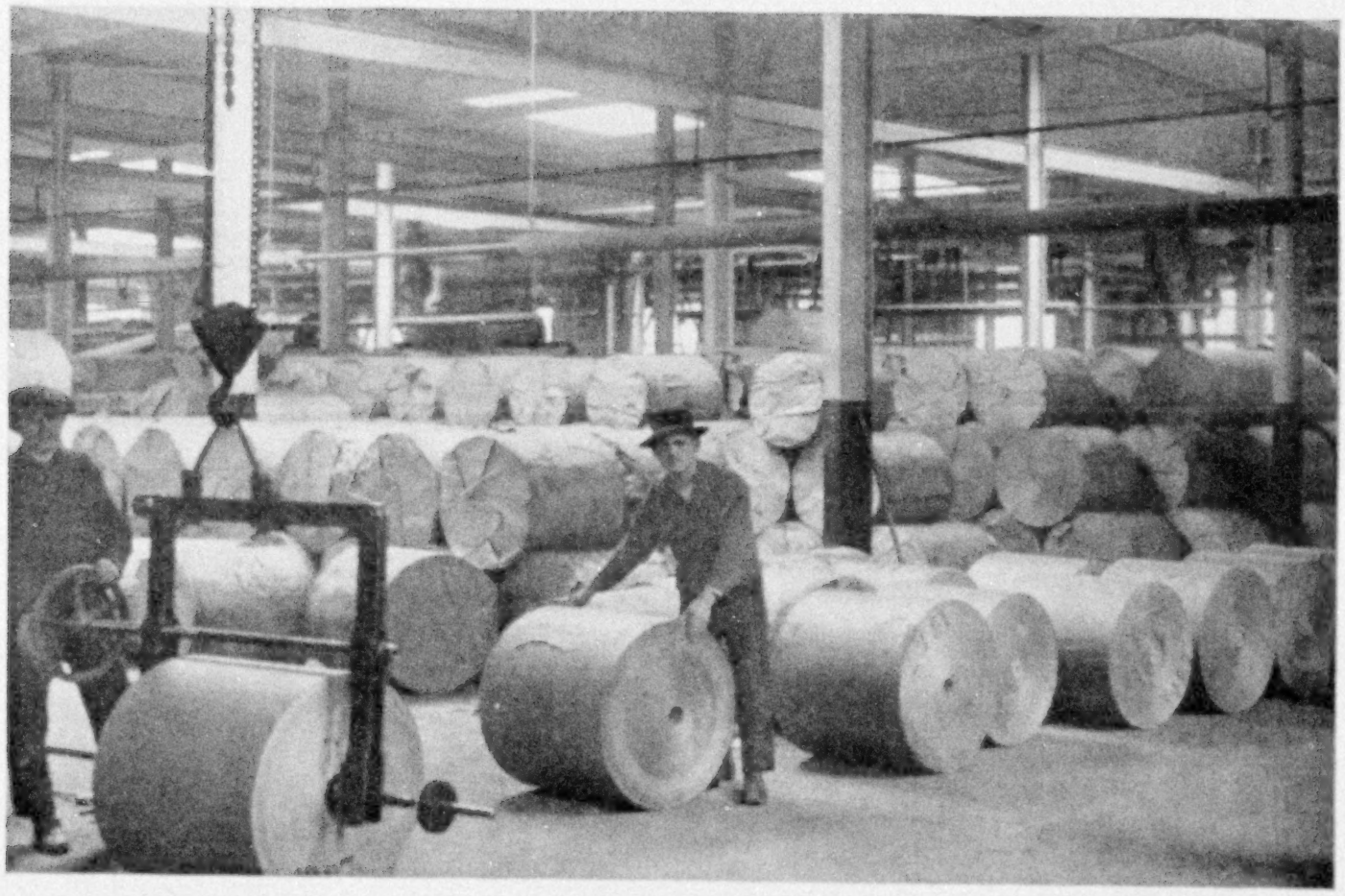
The Ruhr is preëminently the habitat of labor. Everybody works, and nearly everybody works with his hands.



Photographs from Frederick Simpich

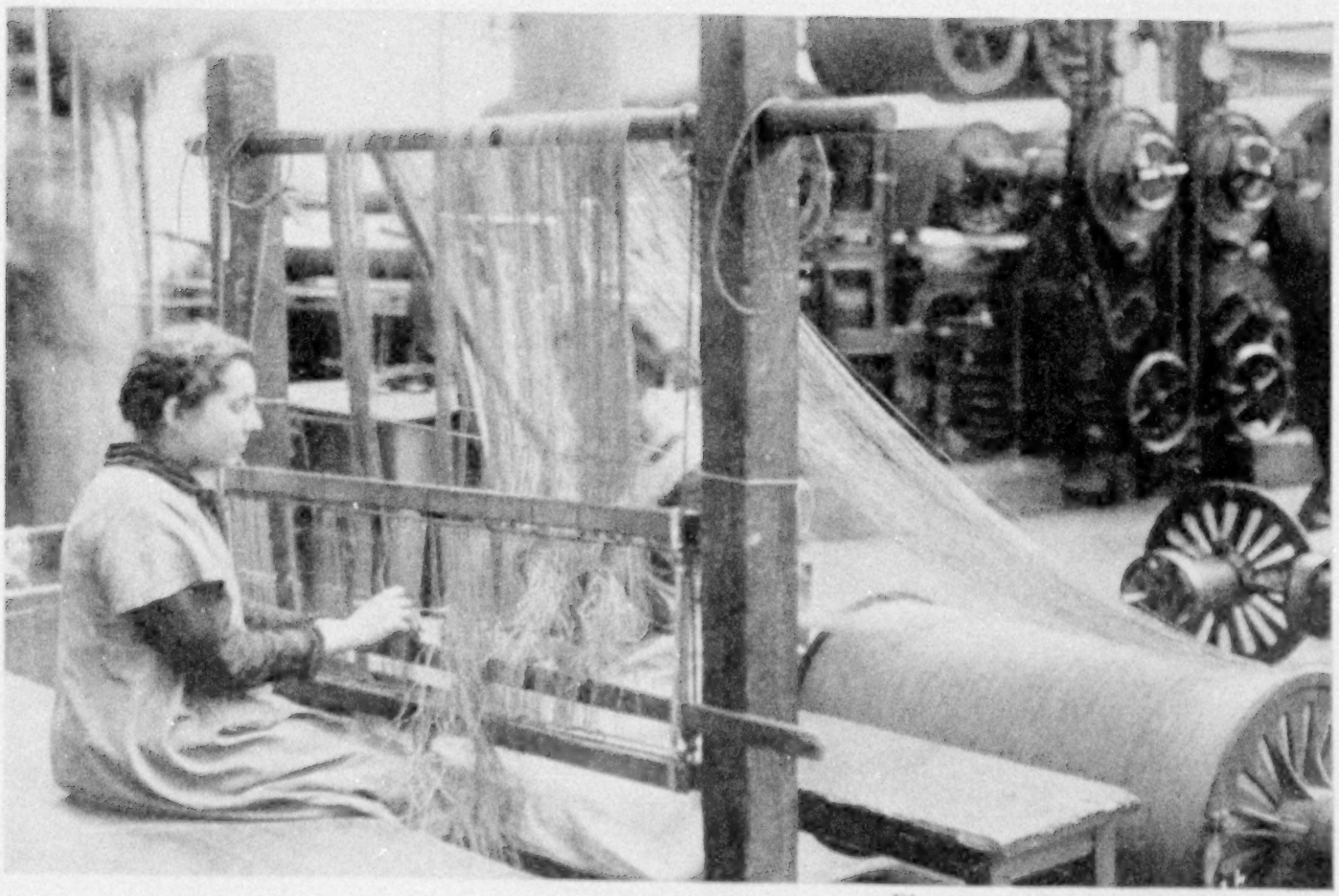
A COTTON MILL IN THE RUHR

There are 9,400,000 spindles like these in Germany. When they all run, in normal times, Germany takes 2,000,000 bales of our cotton a year.



IN A PAPER MILL ON THE RUHR

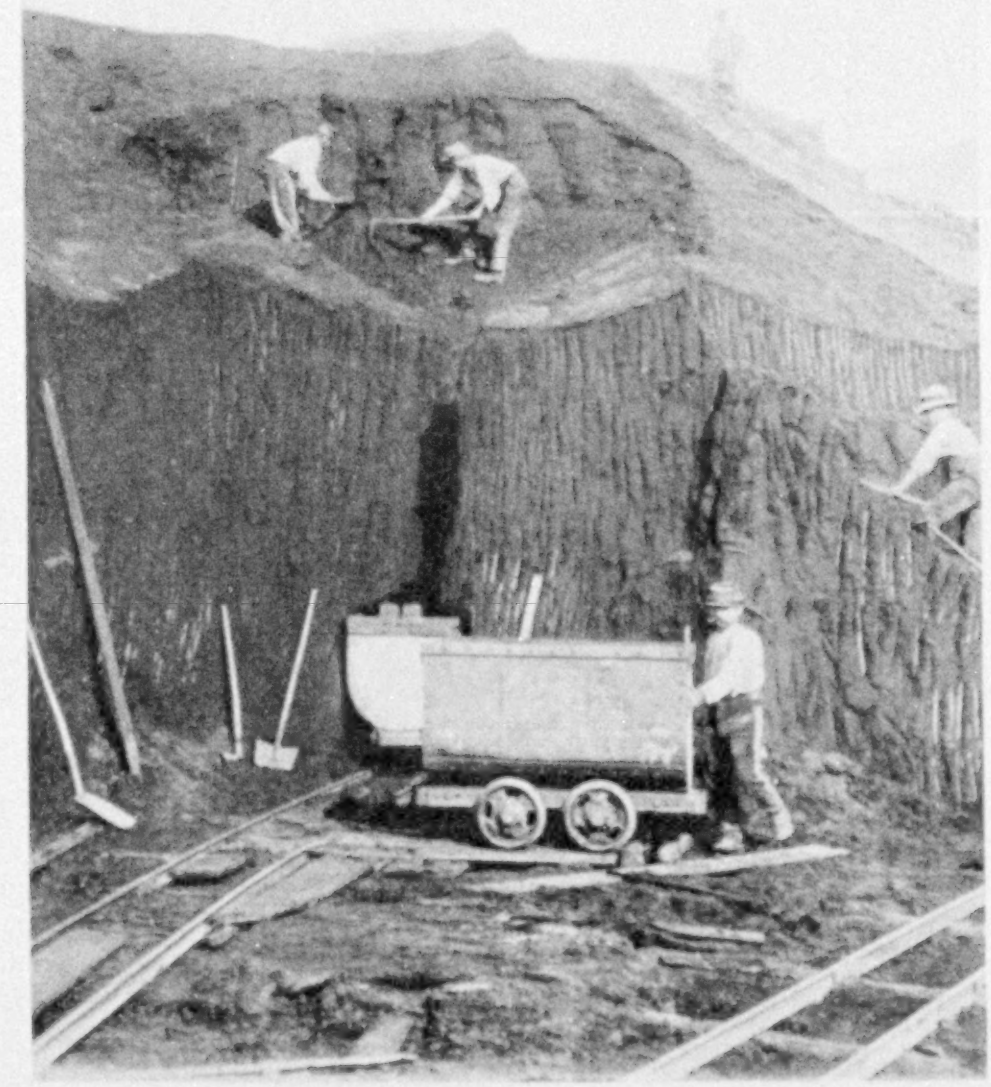
One of America's chief imports from Germany now is cheap newsprint paper. Europe's home consumption of newsprint paper is also enormous, especially for books and pamphlets.



Photographs from Frederick Simpich

MAKING FABRICS OUT OF PAPER

Because of cotton shortage in war times, paper came into wide use in making clothing in Germany. Hats, coats, and whole suits of paper colored to imitate tweeds were worn.



Photograph from Frederick Simpich

SOFT-COAL MINING IN GERMANY

This cheap, low-grade fuel is skimmed off the surface, so that a big "brown coal" mine on the flat plains of northern Germany often looks like the empty bed of an ancient lake. Pressed into briquettes, this soft coal becomes a staple article of commerce.

Here, about this time also, spoons were first rolled from one solid block of metal by an odd-looking machine invented for that purpose.

Then came the great era of mass production in steam-engines, hammers, steel tires for railway cars, cast-steel shafts for river and ocean steamers, and finally that astonishing output of guns and armor plate which brought the militaristic nations of the world to buy at Essen.

The daily roar of artillery at the proving grounds, where each new gun was tested, added to the din of whistles, rushing trains, and rattling gears, made pre-war Ruhr probably the noisiest place on earth.

It is noisy enough now, but the great guns are silent; Krupp makes them no more. The big lathes that once made guns for every nation, from Chile to China, now turn out shafting for marine and other engines. Box-cars for Belgium, car wheels for South America, and whole tram-line systems for the Dutch East Indies were some of the orders being filled when I saw these giant works a few months ago.

You can picture the size and scope of this colossal plant when I tell you that, literally, the coal and iron come in at one end of the flock of factories and emerge at the other in the form of finished locomotives, with steam up for testing, or as plows, all painted and ready for the farm, or as the finest nickeled instruments and tools.

But, amid all this mad drama of frenzied production, nothing can compare, in sheer human interest and excitement, with the adventurous life of the masked men who battle with red-hot iron in the heat, fumes, and dust of the furnaces and mills. It is like a moving picture from hell—a scene to baffle the descriptive skill of Dante or Doré.

Think of one block of red-hot metal weighing 85 tons tossed about with cranes and hooks like baggage on a dock! Then from between giant rollers, with a deafening boom and a hiss like cannon fire, the long rails and strips shoot out white hot and crawling like fiery serpents. Let a workman but stumble then, or take a

single false step, and he pays with his life.

Its famous crucible steel is the oldest specialty of Essen. To obtain it, raw materials especially chosen are melted in separate crucibles and then poured together to form the ingot. This particular steel is said to excel all others in purity; the giant ingots are absolutely homogeneous, close-grained, and uniform throughout.

Lately, too, a new stainless and rustless steel has been made at Essen. It is claimed that not even boiling nitric acid can affect it, and it is well adapted as a substitute for nickel-plate in the manufacture of surgical and other instruments.

Aside from its truly amazing industrial aspects, with its singularly adequate welfare institutions for aged and crippled workmen, Essen is only an overgrown German factory town—somber and smoky. It is the sort of place you like to see—once. At near-by Werden, fitting background to the drab dullness of Essen, stands an old Benedictine abbey, used now as a penitentiary.

Photograph from Frederick Simpich

A BOAT LOAD OF PEAT FROM THE MARSHES

Over these canals millions of tons of bulky freight—peat, coal, stone, and cement—are moved every year. To these canals in winter thousands of skaters come for Europe's greatest cold weather sport.

The Ruhr River itself rises on the north side of Winterberg, in Sauerland, flows northward past the romantically situated town of Arnsberg, and thence winds on down into the mining district around Hagen. Here, after receiving the waters of the Lenne, it twists on past Witten, Steele, Kettwig, and Mulheim, getting greasier and blacker as it washes past coal dumps and foundries, till it joins the Rhine at Ruhrort. From this point, also, the Ruhr Canal connects it with Duisburg.

From Witten to its mouth, some 43 miles, the Ruhr is navigable, with the aid of a dozen locks, but low water often delays the boats. Here and there, along its busy course, it even finds time to pause and turn the wheels of little mills and factories. Down the Rhine the trade of the Ruhr moves out to sea.

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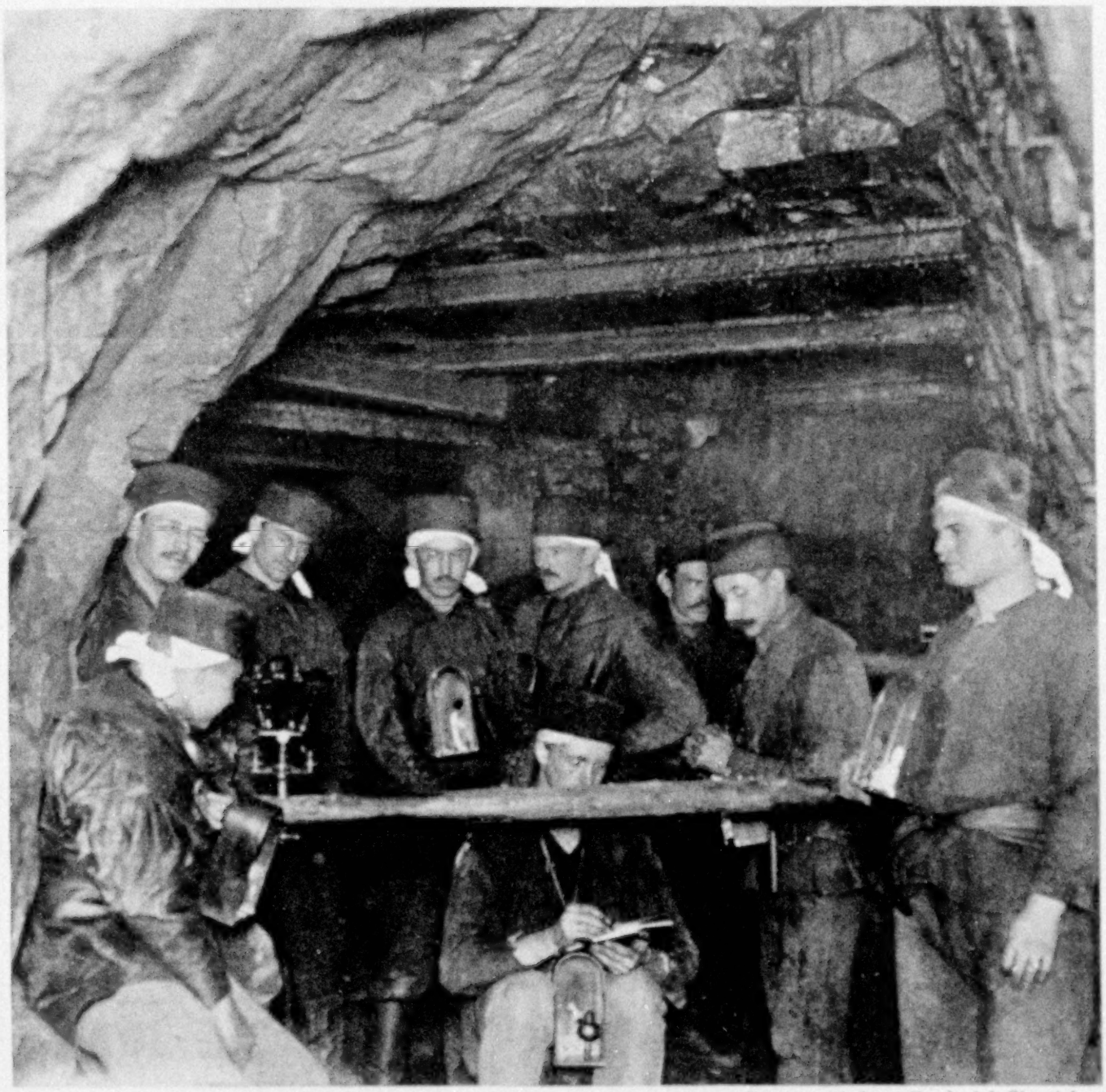

Photograph from Frederick Simpich

COAL MINERS OF THE RUHR

For 600 years men have delved in these mines along the Ruhr, often working stark naked in stifling heat and dust for the coal that Europe needs (see text, page 554).

Here water traffic fairly crowds the stream. Boats are everywhere, as thick as Chinese junks and sampans at Canton or Newchwang. But there is no jamming, ramming, shouting, and battling with oars or poles, as among the belligerent boatmen of the East. Here are semaphores, signal flags, order. Hundreds of boats are handled a day, with the same precision and speed that we handle trains at a great American union station.

At Duisburg-Ruhrort you can see scores of boats berthed side by side, as box-cars are parked in the railway yards at Chicago. Here is one of the world's greatest river harbors, a solid line of wharves five miles long.

This Rhine, this artery of Europe, this *Rhenus Superbus*, as the Romans named it when they built Cologne, how few Americans realize what it means to western Europe! From the Alps to the sea, from Lake Constance down to Rotterdam, "the village of herrings," this swift stream, green and shallow, tumbles along; into its foaming waters are crowded over twenty thousand steamers, tugs, and barges—a tonnage of nearly five millions.

And up the Ruhr and down the Ruhr, in ceaseless procession, move hundreds of

Photograph from Frederick Simpich

WRECK OF A RHINE BARGE

Thousands of these long craft, with quarters astern for the captain's family and a coop for his chickens, crowd the swift, shallow waters of the Rhine, moving 85,000,000 tons of freight a year.

light-draft boats and barges carrying coal, ore, building materials, and manufactured products.

From Cologne to London, too, by way of the Rhine and serving the Ruhr frontier, runs a regular line of specially built river-sea steamers, which do away with the cost of unloading and reloading from river barge to ocean steamer, or *vice versa*, at Rotterdam.

Ideas, as well as boats, it is said, are carried on great rivers. Here, then, may be a lesson for America on how to use inland streams. Through all this region railways parallel the rivers, cross and recross them, and compete with them: yet the water-borne cargoes continue to be enormous, taxing the capacity of twice ten thousand bottoms.

A NETWORK OF CANALS AND CHANNELED STREAMS

No country has developed its water transport to a higher efficiency. The whole of Germany is covered with a regular network of canals and channeled streams, linked up with one another wherever practicable. For example, by means of the Rhine-Rhone and the Rhine-Marne canals, the Rhine is connected with a large part of southern France; in the same way, its lightest-draft barges can get through to the headwaters of the Danube through the Main and the Ludwig Canal, and to the Weser by a canal now being extended to Hanover and thence to the Elbe.

Through this service to the Danube, barges can actually now carry goods from the Ruhr to the far-away Black Sea, thus giving an all-water haul to southern Russia, Turkey, and Armenia. And in these latter regions, in the next decade, it seems likely that engines, rails, and other Ruhr products will be largely consumed.

Since its great growth began, many busy Ruhr towns have grown up along the rivers and canals, at points nearest the mineral deposits. Duisburg, or Duisburg-Ruhrort, where Mercator, the great geographer, died, and which now includes Hochfeld, Meiderich, and Ruhrort, is

SCHLOSS ELTZ, ONE OF THE BEST PRESERVED CASTLES OF THE RHINE VALLEY

The Rhine enjoys the double distinction of being the chief commercial artery of Western Europe and one of the most romantic and picturesque waterways in the world. This medieval structure towers above the narrow, tortuous valley of the Elz.

easily the greatest of all the Rhine's busy ports.

Geographically, too, the adjoining harbors of Alsum, Walsum, Homberg, and Rheinhausen are considered one with that of Duisburg. And here you see the great Rhine working at maximum capacity. Each year it hauls nearly 85,000,000 tons of freight!

Chief among these Ruhr factory towns are such places as Dusseldorf, Essen, Elberfeld, Barmen, Hagen, Mulheim, Solingen, Bochum, Dortmund, and Remscheid, besides many smaller but equally busy centers.

Dortmund, the largest city in Westphalia, boasts a history dating back a thousand years. Long ago it was a free, fortified Hanseatic town, and once it withstood a siege of twenty-one months, "led by the good bishop of Cologne and forty-eight other princes." It is proud of its churches, centuries old; its monasteries, with their relics and antiquities, and its municipal museum, with prehistoric, Roman, and Germanic collections.

Hard by is the historic hill of Hohen-Syburg, where Charlemagne fought with the Saxons. From its crest you can view the vast, smoking, seething valley of the Ruhr, where drones and idlers are an unknown human species.

Then there is Oberhausen, site of the famous "Gutehoffnungshüte," one of the largest iron and steel mills in all this humming, mill-specked region.

This Ruhr is preëminently the habitat of labor. Everybody works, and nearly everybody works with his hands. An army of chemists, engineers, and technical men is employed, of course; but they form merely a small element of the grimy, dusty, sweating population that keeps the coal moving, the furnaces roaring, and the big lathes turning.

The population, variously estimated at from three and one-half to four millions, is not easy to determine, because thousands come and go as the tide of trade rises and falls; and nowhere is the world-wide house shortage more keenly felt than in this densely peopled area. About many of the mines the government has set up temporary barracks, where thousands of miners are housed.

Poles and men of Polish birth, probably a hundred thousand of them, figure in the daily life of this industrial region. They have brought with them their own speech, habits, and religion and they form their own social groups. Many of them, like the hordes of "Saxongängers" who in normal times swarm down into Saxony every crop season, return eventually with their savings to Poland.

This group, though reduced by war, is still conspicuous, but has become largely naturalized and serves, too, to strengthen the Catholic element in this otherwise largely Protestant section of Germany.

In the more picturesque and less crowded spots of the Ruhr the overlords of industry have reared their villas and spacious homes; but a distinctive leisure class, an idle rich, like the groups conspicuous in Charlottenberg, Dresden, or Wiesbaden, is not found. Hundreds are here who have *retired*, but they are the aged and pensioned workmen, dozing comfortably in the clean, cosy colonies built for them in cities like Essen.

"EARLY CLOSING" IS THE RULE IN THE RUHR BASIN

Schools there are, of course, and higher seats of learning in the larger cities; there are old miners, too, detailed to teach the miners' sons how to wield the pick, to shoot out a load, or dump a push-car. And even the smallest industrial center supports its inevitable café, its park and beer garden, and its "Lichtspiel," or movie theater; but they close early, and by 10 o'clock at night the streets of Essen are as empty as the ruined streets of Pompeii; for the Ruhr miner is a sane, thrifty, and methodical soul; he knows no man who works eight hours a day 2,000 feet underground could hold his job and dip very deep into such gay night life as that on "Kurfurstendamm" or in the "Nachtlokals" of Dresden and Hamburg.

Hard times come here, as in every great industrial region, when, for one reason or another, many men are out of work; but the professional tramp, like our hobo or "blanket stiff" who rides the rods, is an unknown character.

Here, too, women workers are numerous; you see them tilling the tiny fields between the towns, handling trunks and freight about the stations, or, more to the north, digging and hauling peat from the wet lowlands.

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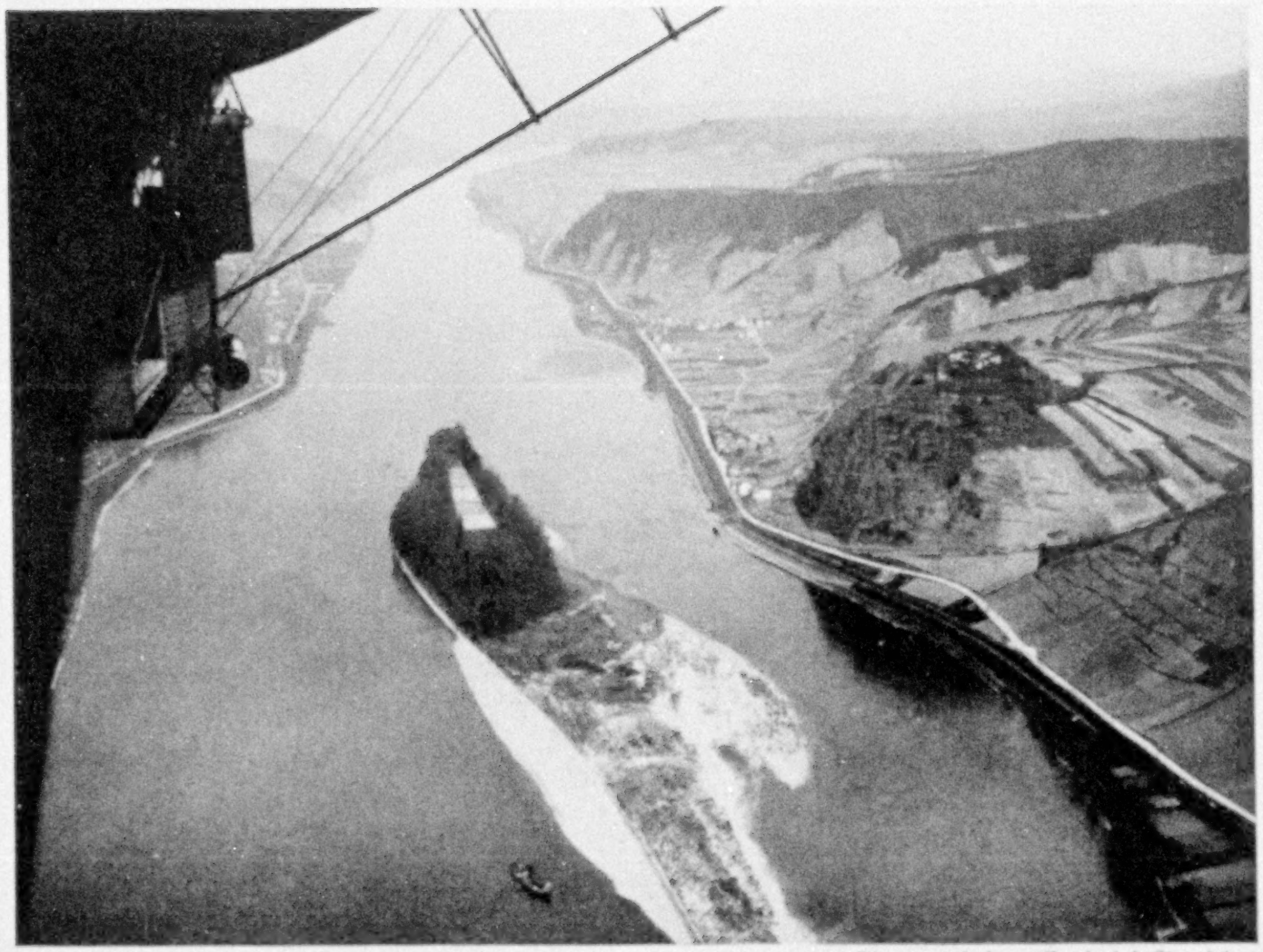

Photograph from Frederick Simpich

THE RHINE SEEN FROM A ZEPPELIN

More conspicuously, too, than anywhere else in Germany, and standing shoulder to shoulder with the trusts and combines, the Ruhr unions and workmen's councils, the *bunds* and *vereins*, are active and influential. Public meetings, debates, and conferences, though peaceful and orderly, are never ending. Every popular idea, from birth-control and old-age pensions to mutualism and government ownership, is aired by speakers and writers. In every town, despite the high cost of paper and printing, the news-stands are piled high with new-made books and red-backed pamphlets on current labor and socialistic thought. Hardly is the ink dry on one writer's printed opinion when an opponent rushes to press with an equally plausible counter-argument.

COAL IS LIFE TO THE RUHR FOLK

But to these Ruhr folk *coal is life*. Storm center though the region is for all phases of industrial dispute, the talk of the streets always comes back to coal—coal, the key to Germany's future. Life in the mines is drama, intense and thrilling. Every man with a pick is an eager actor. Every lump that moves is that much to Germany's credit.

Such is the story of the Ruhr. Under the dirty smoke that floats from Dortmund to Dusseldorf, thousands toil to live, to help Germany pay. As she wins back her place in world trade, much that she sells overseas must come from this clangorous, prodigiously p r o d u c t i v e Ruhr—mills to squeeze juice from cane in Java, bean-oil mills for Manchuria, car wheels for Canada and the U. S. A., and farm implements for Argentina.

And, when the tumult and shouting in Russia is over, it is from this same Ruhr that she will buy much of her sorely needed engines, cars, rails, and bridge steel.

A tiny speck on the map is this heated, smoking, Ruhr, but big, like a cinder, in the world's eye—a spot that Cæsar knew, a high spot in a region old in history.

Here is a game the kids acclaim
With vigor, vim and zest.
Their pep and force derived, of course,
From "Ox Tail" at its best.

—and thereby hangs a tale

Campbell's is Ox Tail Soup at its best. Not merely a deliciously satisfying food, but a recognized health-builder as well. It brings you, in a tasty dish, the native vigor of meaty, marrowy ox joints; the beneficial properties of fresh vegetables and herbs; the strength-building qualities of barley.

Campbell's Ox Tail Soup

A rich, nourishing stock, made from medium-sized ox tails, combined with diced Chantenay carrots and golden turnips, tomato puree, sliced ox tail joints, celery, parsley, barley, a little leek, and a touch of flavoring to bring out the natural savor of this delicious combination. Order Ox Tail today.

21 kinds **12 cents a can**

Campbells' Soups

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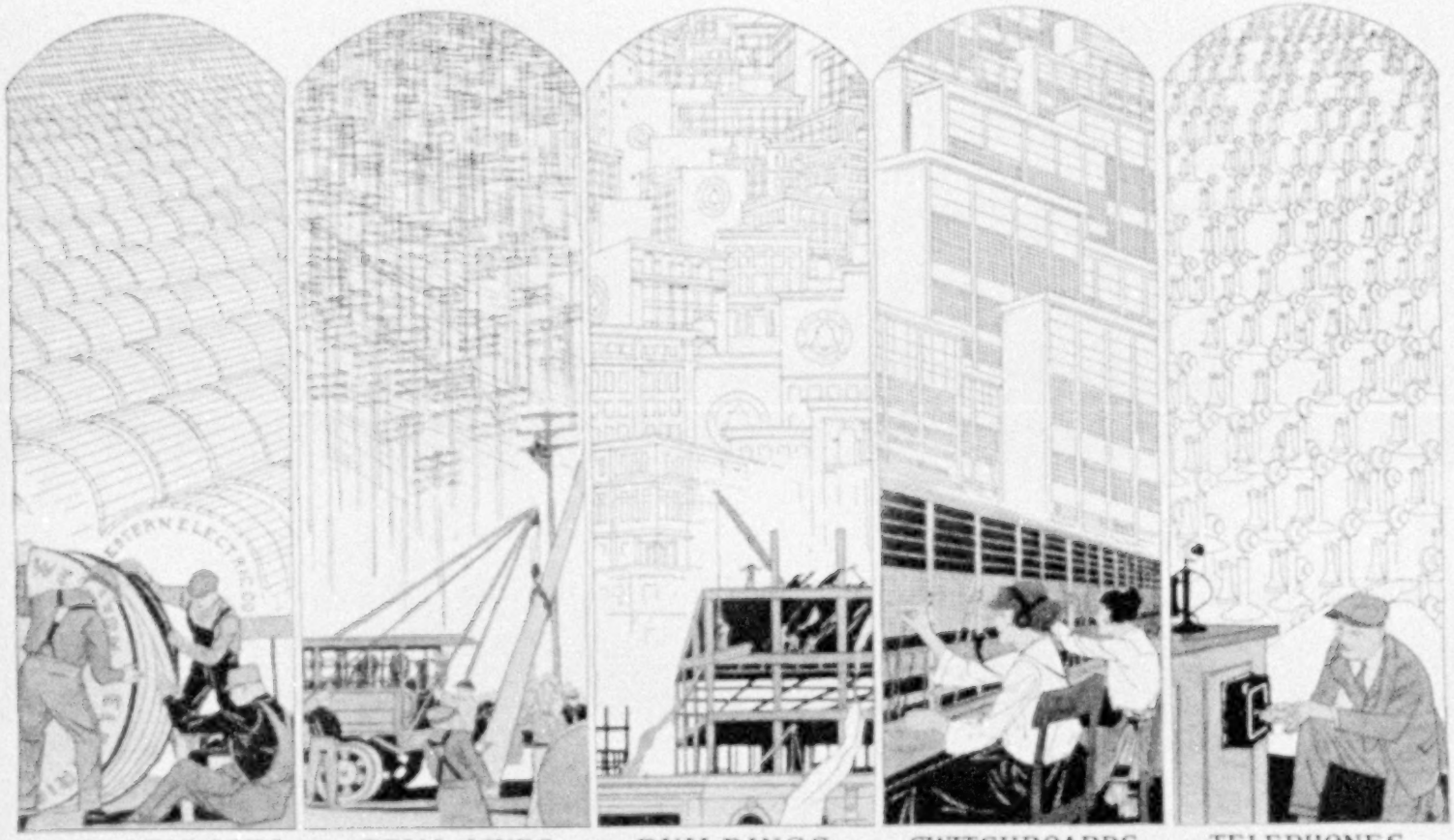

UNDERGROUND LINES AERIAL LINES BUILDINGS SWITCHBOARDS TELEPHONES

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Since 1920, faced with the greatest demand for service in telephone history, the Bell System has surpassed all previous records for the installation of new telephone equipment. In the last two years more than 1,000,000 additional stations have been added to the system by construction. This is equal to the entire number of telephones in Great Britain.

In 1921 alone, 450,000 new poles were placed—enough to make a telephone line from New York to Hong Kong. The aerial wire put into service in the same year, 835,000 miles in all, is enough to string 60 wires on such a telephone line.

1,875,000 miles of wire, enclosed in 1,500 miles of cable, were added to underground and submarine lines in 1921. New underground duct totaling 11,000,000 feet was constructed, this representing approximately 300 miles of subway. 69 new central office buildings and important additions were completed or in progress, and new switchboards with a capacity of many thousands of connections were installed.

This equipment added to the Bell System, great though it is in volume and value, represents but a small part of the vast property which enables the telephone on your desk to give the service to which you are accustomed. And to meet the increasing demands for new service, the work of construction goes on.

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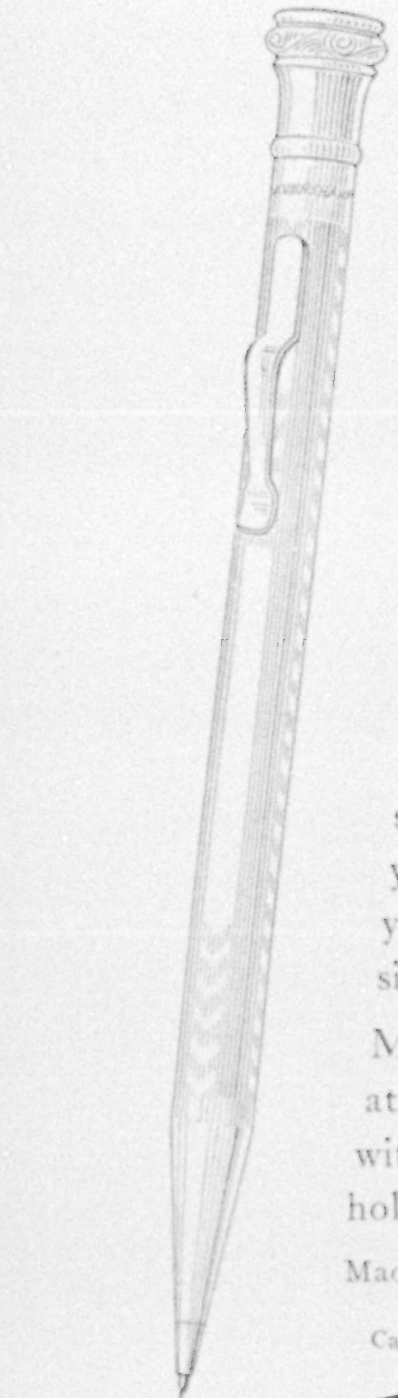
SHORT TERM NOTES
ACCEPTANCES



The Pencil of business efficiency

Clear thinkers write it down. They reach instinctively for their Eversharp, as they would for their watch. At the conference table, in the drafting room, everywhere in the day's work you find Eversharp making its mark smoothly, yet with firmness and exactness that reminds you no other pencil can be like Eversharp.

Efficiency did it! Eversharp is a time-saver; no sharpening, no interruption to your thoughts. Examine Eversharp and you wonder how such mechanical precision can be obtained in such small space.

Many styles in gold, silver and enamel, at 65c to $65. Matched by the Wahl Pen with the famous all-metal barrel that holds more ink. Sold everywhere.

Made in U. S. A. by THE WAHL COMPANY,
CHICAGO

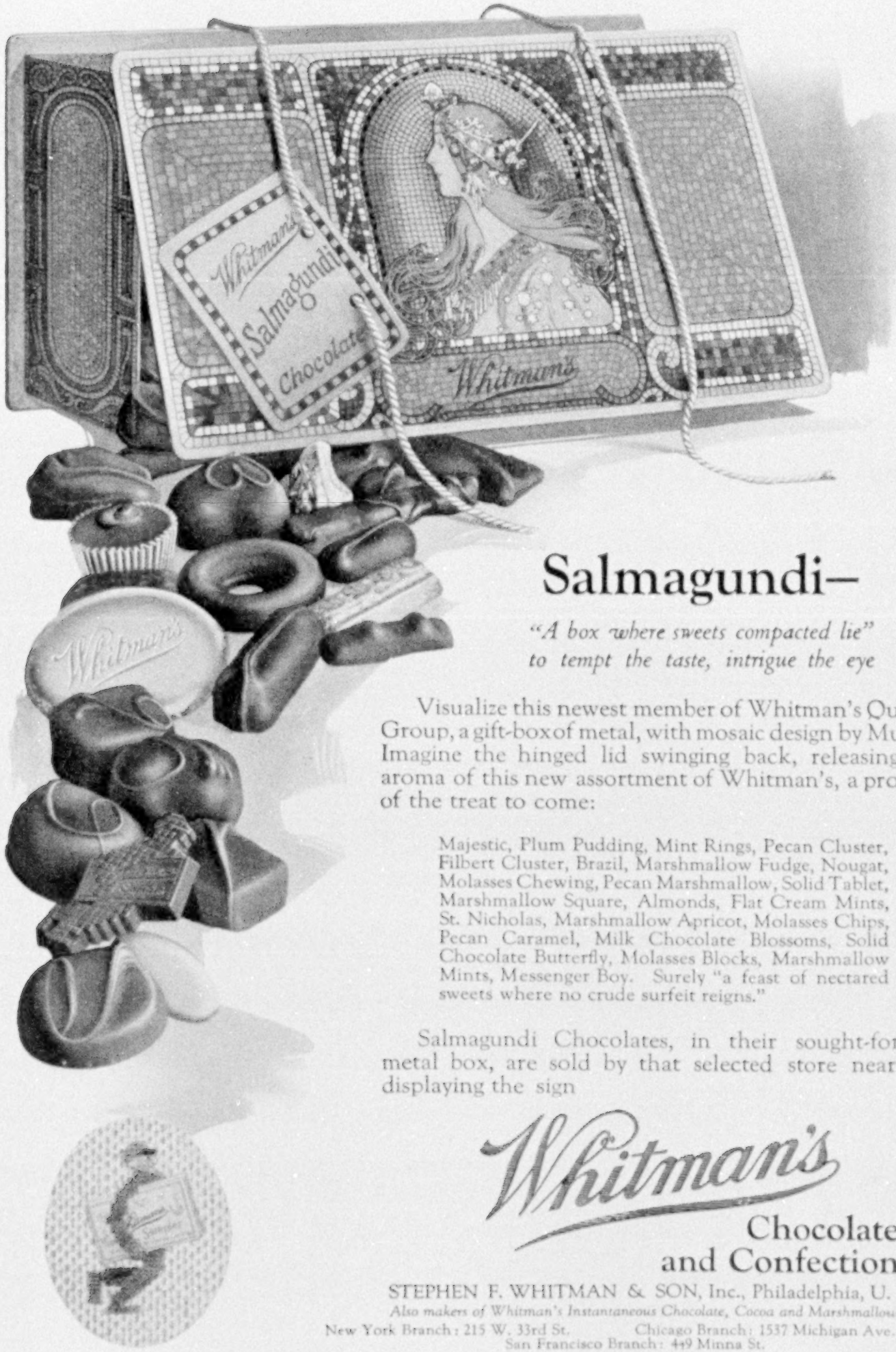
Canadian Factory, The Wahl Company, Ltd., Toronto.

EVERSHARP

REG. U.S. PAT. OFF.

Use only Eversharp Leads, 12 in a box. They fit accurately. Seven grades.

2B—Extra Soft
B—Soft
HB—Medium Soft
F—Firm
H—Medium Hard
2H—Hard
4H—Very Hard
Also Indelible



Salmagundi—

"A box where sweets compacted lie"
to tempt the taste, intrigue the eye

Visualize this newest member of Whitman's Quality Group, a gift-box of metal, with mosaic design by Mucha. Imagine the hinged lid swinging back, releasing the aroma of this new assortment of Whitman's, a promise of the treat to come:

Majestic, Plum Pudding, Mint Rings, Pecan Cluster, Filbert Cluster, Brazil, Marshmallow Fudge, Nougat, Molasses Chewing, Pecan Marshmallow, Solid Tablet, Marshmallow Square, Almonds, Flat Cream Mints, St. Nicholas, Marshmallow Apricot, Molasses Chips, Pecan Caramel, Milk Chocolate Blossoms, Solid Chocolate Butterfly, Molasses Blocks, Marshmallow Mints, Messenger Boy. Surely "a feast of nectared sweets where no crude surfeit reigns."

Salmagundi Chocolates, in their sought-for art metal box, are sold by that selected store near you displaying the sign

Whitman's

Chocolates
and Confections

STEPHEN F. WHITMAN & SON, Inc., Philadelphia, U. S. A.
Also makers of Whitman's Instantaneous Chocolate, Cocoa and Marshmallow Whip
New York Branch: 215 W. 33rd St. Chicago Branch: 1537 Michigan Ave., South
San Francisco Branch: 449 Minna St.

THE TIRE COMPETITION OF TOMORROW

THERE has been more advance in the *art of tire making* in the past five years than in almost any other one thing.

That so many of these advances *originated* with the makers of U. S. Tires is perhaps aside from the point.

The concern of the car-owner himself is how *he* is going to benefit.

* * *

If tire manufacturers make no attempt to outrival each other in *quality*, where does the tire user get *his* consideration?

The makers of United States Tires urge upon *everybody*—manufacturer and dealer alike—a *new kind* of competition.

Let us compete for more and more *public confidence.*

Let us compete for higher and higher *quality.* Let us compete for *still more dependable* public service.

This has been the developed U. S. Policy over a period of many years.

Today at present prices U. S. Tires are the biggest money's worth any motorist ever rode upon.

For the production of United States Tires there is erected and operating the greatest group of tire factories in the world.

A leadership that has recorded itself with the public. The outstanding example of what faithful quality and sound economy can do when it is patient enough to prove itself to a whole nation.

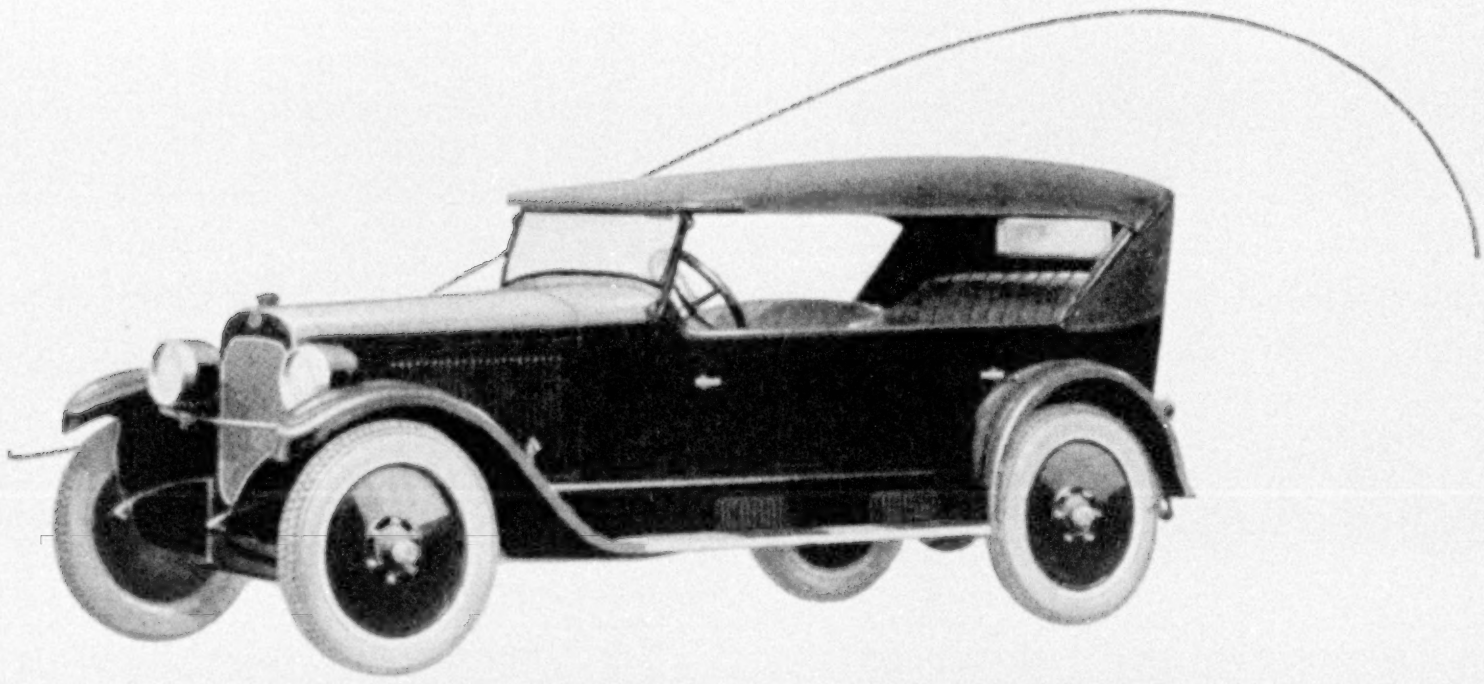
United States Tires are Good Tires

Copyright 1922 U. S. Tire Co.

U. S. Royal Cord Tires

United States Rubber Company

Fifty-three Factories — *The Oldest and Largest Rubber Organization in the World* — *Two-hundred and thirty-five Branches*



A New and Finer Kind of Six-Cylinder Performance

Until you see the New Series Chalmers Six, you can have no real conception of the wonderful value it is.

Until you drive it, you cannot know the great new advance it represents in fine six-cylinder performance.

All the splendid properties for which the six, as a type, is prized, are here developed to a nearer point of perfection.

The power-flow is even more smooth; the blending of cylinder impulses more complete; the acceleration more spirited; and the flexibility is pure delight.

Not only the famous Chalmers engine, but the entire car, has been the subject of a solid year of engineering scrutiny and refinement.

This is, in our opinion, the finest-performing six we have ever built—a car of enticing comfort and surpassing beauty.

Every mile you travel in it confirms again the remarkable value indicated by its size and appearance, and the details of its finish and equipment.

All Models Equipped with Disc Steel Wheels and Cord Tires

Five Passenger Touring Car, $1395; Seven Passenger Touring Car, $1495; Roadster, $1345; Coupe, $1995; Sedan, $2295. These prices f.o.b. factory, Revenue tax to be added

Chalmers Motor Car Company, Detroit, Michigan

Chalmers Motor Company of Canada, Limited, Windsor, Ontario

The CHALMERS SIX

Note the luxurious Karpenesque upholstery of this beautiful arm chair

Karpen Furniture

WHAT a haven of comfort at the end of the day is a luxurious Karpen Upholstered Chair or Davenport. How gratefully we relax in its soft, yielding cushions.

But comfort to be real must be restful and pleasing to the eye as well. The inbuilt quality of every Karpen piece insures these attributes.

Combined with grace and beauty of design, Karpen Furniture has the authority of mastery back of it. Its highest ambition is to excel, its constant ideal is service.

* * *

Book Q of Distinctive Designs, with the name of a Karpen dealer, will be sent upon request.

Karpen Guaranteed Upholstered Furniture

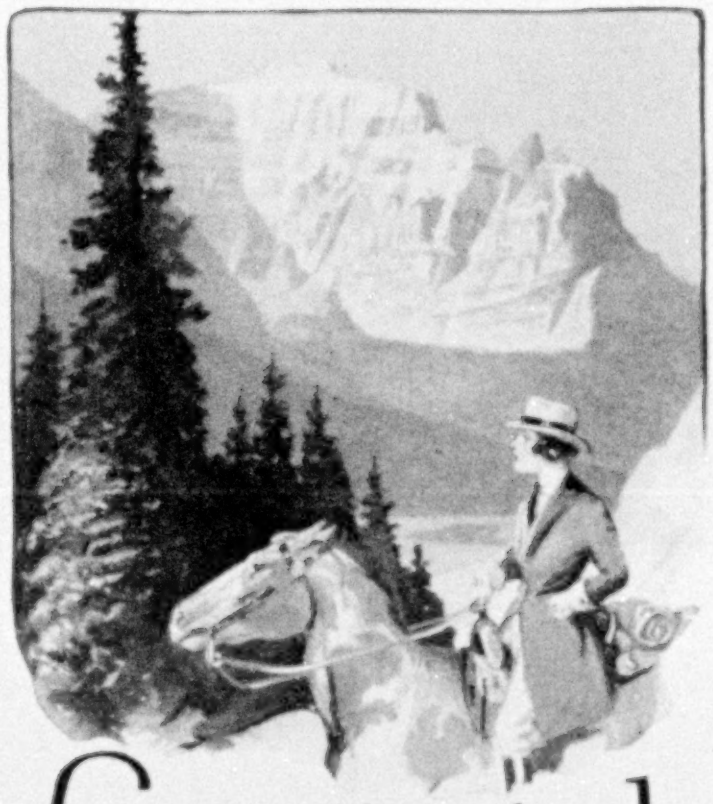
On every piece
Make sure it is there

S. KARPEN & BROS.

Also manufacturers of Karpen Fiber Rush and Reed Furniture and Dining, Office, and Windsor Chairs

Exhibition Rooms

801-811 S. Wabash Ave. CHICAGO — 37th St. and Broadway NEW YORK



for ALL the Family to Enjoy

Go to the mountains this year—out to Glacier National Park where you are free to play as you like. Ride horseback along skyland trails—motor over scenic highways—fish in azure lakes—hike mid flower-carpeted forests. Find restful comfort in modern hotels and rustic chalet camps.

Glacier National Park

Open June 15 to September 15

is on the main line of the Great Northern—only two nights (through trains) from Chicago—only three nights from New York.

Compartment observation cars—standard and tourist sleeping cars and dining car to Glacier Park, Spokane, Seattle, Tacoma and Portland. Stops at Glacier Park Hotel, eastern entrance. En route to North Pacific Coast, Alaska or California, visit Lake Chelan, Mt. Rainier and Crater Lake National Parks. "In all the world no trip like this."

LOWER RATES FOR THE SUMMER

For free books and information apply any ticket or tourist agent or Great Northern Railway offices

226 West Adams St. Chicago, Ill.
280 Broadway New York City
708 Empire Building Pittsburgh, Pa.
516 Railway Exchange Kansas City, Mo.

See America First

GREAT NORTHERN RAILWAY

A. J. DICKINSON, Passenger Traffic Manager
St. Paul, Minn.

A Delightful Test

To bring you prettier teeth

This offers you a ten-day test which will be a revelation to you. It will show you the way to whiter, cleaner, safer teeth.

Millions of people of some forty races now employ this method. Leading dentists everywhere advise it. You should learn how much it means to you and yours.

Clouded by film

Your teeth are clouded more or less by film. The fresh film is viscous — you can feel it with your tongue. It clings to teeth, enters crevices and stays.

Old methods of brushing leave much of that film intact. The film absorbs stains, so the teeth look discolored. Film is the basis of tartar.

How it ruins teeth

That film holds food substance which ferments and forms acids. It holds the acids in contact with the teeth to cause decay.

Millions of germs breed in it. They, with tartar, are the chief cause of pyorrhea. So most tooth troubles are now traced to that film, and they are almost universal.

Now we combat it

Dental science, after long research, has found two film combatants. Many careful tests have proved their efficiency. Leading dentists everywhere urge their daily use.

A new-day tooth paste has been created, called Pepsodent. It complies with modern requirements. And these two great film combatants are embodied in it.

Two other effects

Pepsodent brings two other effects which authority now deems essential. It multiplies the starch digestant in the saliva.

It multiplies the alkalinity of the saliva. That is Nature's neutralizer for acids which cause decay.

Send the coupon for a 10-Day Tube and watch these effects for a while. Note how clean the teeth feel after using. Mark the absence of the viscous film. See how teeth whiten as the film-coats disappear.

Then judge the benefits by what you see and feel. You will be amazed.

Pepsodent PAT. OFF. REG. U. S.

The New-Day Dentifrice

Endorsed by modern authorities and now advised by leading dentists nearly all the world over. All druggists supply the large tubes.

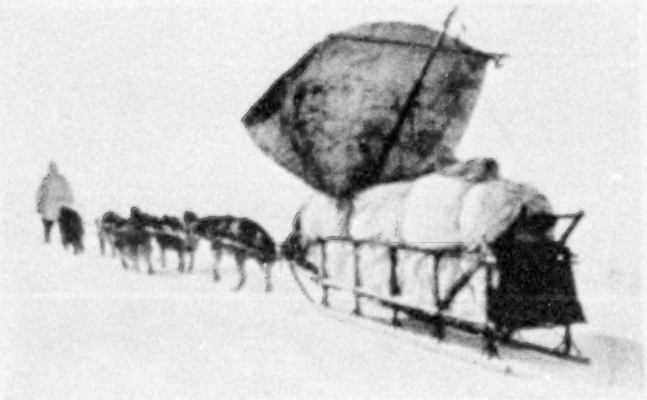
10-Day Tube Free 870

THE PEPSODENT COMPANY,
Dept. 870, 1104 S. Wabash Ave., Chicago, Ill.
Mail 10-Day Tube of Pepsodent to

Only one tube to a family

XUM

"It can't be done"—but he did it



Skin Sail on the "Prairie Schooner" That Blazed the Trail to a New Frontier

REVISE your old ideas about the Arctic in one of the finest narratives of adventure ever written. For in

The Friendly Arctic

By

VILHJALMUR STEFANSSON

Hubbard Gold Medalist of the National Geographic Society; Gold Medalist of the six other European and American Geographic Societies; President, Explorers' Club of New York

America's foremost Arctic explorer holds you thrilled and absorbed as, led with the same spirit which sent our pioneers across the prairies, you penetrate the "Foodless, Frozen Ocean." Instead of "certain death" by starvation in the lifeless, icy waste of age-old myth, Stefansson discovers a friendly region of ample game where life would be ideal but for the summer heat and the mosquitos! *"Flavor of a Conrad novel."—Spokesman Review.*

Mental Tonic for Home or Office

It is a mental tonic for the "go-getters" of the business and professional world and a great tool for all executives who have to "pep" assistants up to the point where they will not let rumor or inertia slow them up. *"Great and significant piece of pioneering."—New York Times.*

For "unique interest and importance of *The Friendly Arctic*—the outstanding geographic publication of 1921," describing 100,000 square miles added to known North America, the National Geographic Society has awarded Mr. Stefansson the Grant Squires Prize.

850 pages—138 illustrations—9 maps
Bound in cloth, $6, postpaid

My Life With the Eskimo

In this forerunner of *The Friendly Arctic*, Stefansson shares his adventures in the everyday life of a primitive people—building the comfortable snow-hut, bagging a polar bear, or catching an elusive seal for supper and fuel.

548 pages—108 illustrations—2 maps
Bound in cloth, $6.50, postpaid

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60 Fifth Avenue New York City

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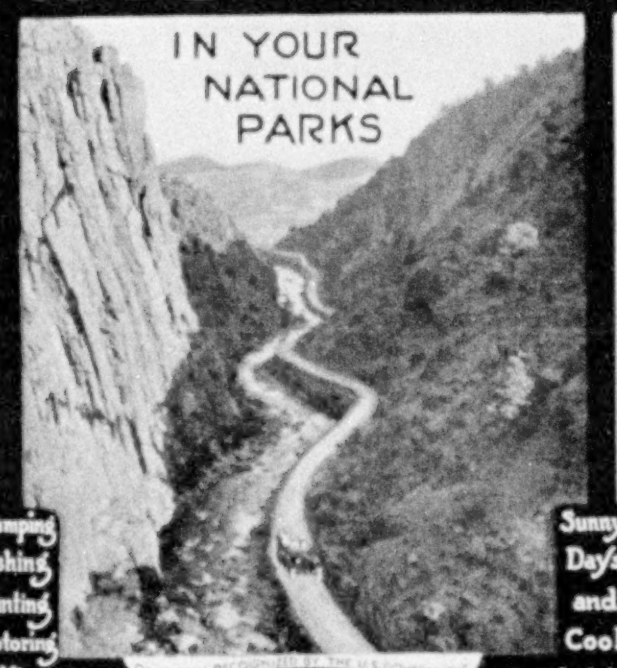
For enclosed $_____, send _____ THE FRIENDLY ARCTIC; _____ MY LIFE WITH THE ESKIMO.

Name _____

Address _____

VACATION



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Sunny Days and Cool Comfortable Nights

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TO 12 NATIONAL PARKS AND 32 NATIONAL MONUMENTS

Rocky Mountain National Park, nearest and most beautiful of all National Parks, is owned and maintained by the U.S. Government as a scenic vacationland. One night from Chicago.

REDUCED RATES---ALL RAILROADS
TO DENVER AND THE COLORADO ROCKIES
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It costs no more to live and enjoy a vacation in your National Parks than at home. Denver has 252 Hotels and 400 Mountain Resorts, at prices to fit any pocketbook. Plan to visit

ROCKY MOUNTAIN NATIONAL PARK

One day; 165 miles; round trip $10.50, rail and auto. Foothills to Loveland, Big Thompson Canon, Estes Park, and Resorts. Return same day, or stop over and enjoy short scenic trips.

DENVER'S MOUNTAIN PARKS

Four hours; round trip; 12 passenger cars $4.00, 7 passenger $5.00; 65-mile scenic trip to Lookout Mountain, Buffalo Bill's Grave, Bergen Park, Troutdale and Bear Creek Canon.

NEVER-SUMMER RANGE TRIP

Two days; 236 miles; round trip $25.50; Rocky Mountain National Parks Trip plus over the Continental Divide on Fall River Road, highest auto trip in the world, to Grand Lake and recross divide over Berthoud Pass to Idaho Springs and thru Denver's Mountain Parks. Return second day or stop over.

Arapahoe Glacier Trip---12 hours, train, auto, horse, guide and noon meal included; round trip $15.00. Echo Lake Trip---8 hours; 107 miles; round trip $8.00. Peak-To-Peak Trip, Longs Peak to Pikes Peak. Mesa Verde National Park Trip. Thirty-eight other short auto trips. One-day rail trips---Platte Canon, Georgetown Loop, Moffat Road.

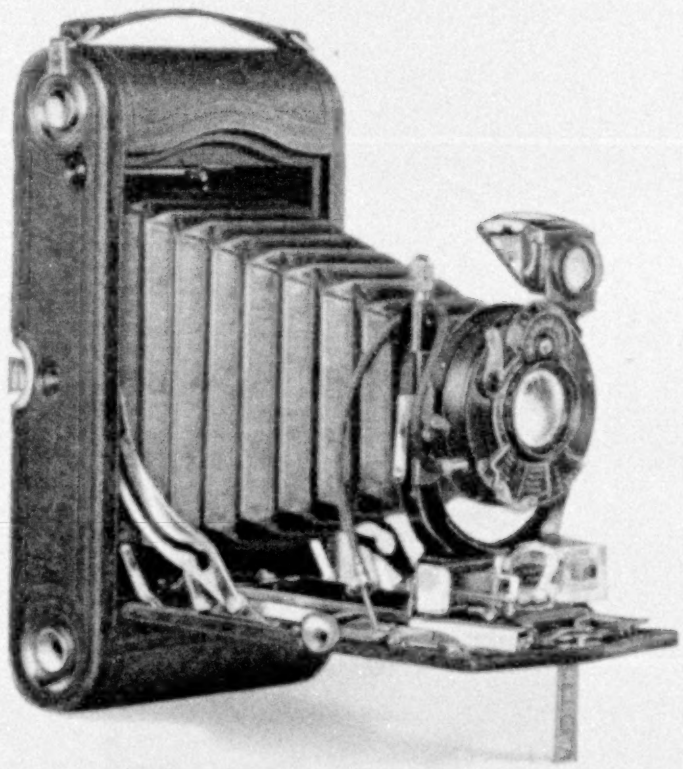
Write Today for Free Booklet

that tells where to go, what to see, what it costs to vacation in cool Colorado. Address

DENVER TOURIST BUREAU

514 Seventeenth St. Denver, Colo.

The *Special* Kodaks



WHILE every photographic convenience practical in a pocket camera is incorporated in the *Special* Kodaks, the feature that immediately stamps them as cameras of a superior sort is their lens and shutter equipment.

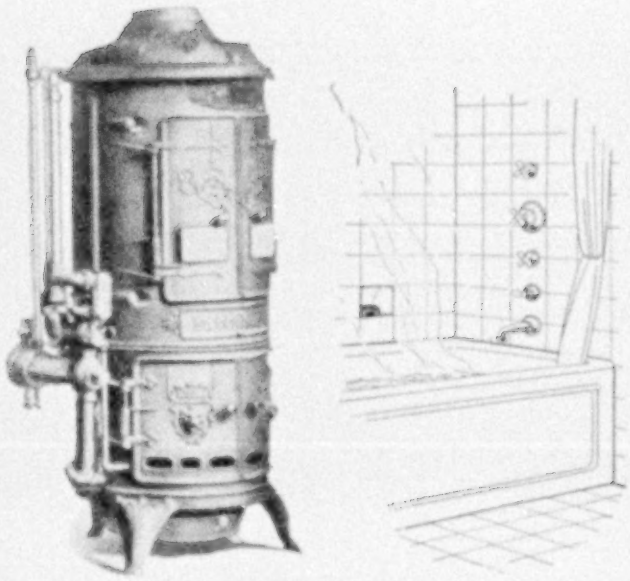
The Lens: The Kodak Anastigmat lens *f*.6.3 is Eastman-made from formula to finish. It has the speed that you want sometimes, and the qualities of flatness of field and definition (sharpness) that you want always. The Kodak Anastigmat *f*.6.3 is the lens for better pictures.

The Shutter: A full-jeweled watch is accurate to the second. The Kodamatic shutter, Eastman-made throughout, is accurate to 1/200 of a second. With automatic exposures as fast as 1/200 of a second and intermediate speeds down to ½ second as well as time and "bulb" action, any amateur is equipped for any picture in the hand camera field.

See the *Special* Kodaks at your dealer's

EASTMAN KODAK COMPANY

ROCHESTER, N.Y., *The Kodak City*



Like a hot water spring in your home

NOTHING adds more to the comfort and convenience of a home than unlimited hot water. With a Pittsburg Automatic in your home, one or a dozen can take a hot shower or bath at any hour of the twenty-four without waiting for water to heat. The Pittsburg delivers hot water instantly, whenever you want it, without delay or limit on quantity.

When you open a hot water tap, here's what happens down cellar where the Pittsburg Automatic is hidden away. The gas flashes into an intensely hot flame *concentrated right on the copper coils the water is passing through.* No waste heat! As fast as the water flows through the coils, it is heated—not lukewarm, but *hot.* When the tap is closed, off goes the gas—AUTOMATICALLY.

Pittsburg
AUTOMATIC GAS
WATER HEATERS

Whether your house is large or small, there is a size that will just fit it. There are also big installations for hotels, hospitals and large buildings.

The local gas office or a prominent plumber in your city can show you a Pittsburg in action. If you write direct to us, mention the number of people and how many faucets you have. We will advise you which size you need and at the same time send you a free copy of "THE WELL-MANAGED HOME."

PITTSBURG WATER HEATER CO.
Pittsburgh, Pa.

$3.00

The Stromberg Gasoline Filter

EVERY car should be equipped with a Stromberg Gasoline Filter. It cleans the gas—removes all dirt and water—just before it enters carburetor. Eliminates repair bills.

Needle valve shuts off flow of gas when sediment chamber is removed for cleaning. Easily attached to vacuum tank, carburetor or gas line—do it yourself. Well made—outlasts car. Prevents theft—it locks car.

Avoids trouble.

State name and model of your car.

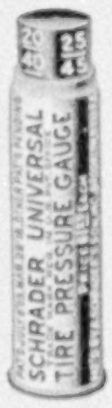
Stromberg Motor Devices Co.
Manufacturers of the Stromberg Carburetor
64 E. 25th St. Dept. 539 Chicago

25% MORE MILES PER GALLON

Tires that are insufficiently inflated need 25 per cent more gasoline to pull them along the road than tires that are inflated to the right pressure.

With a

Schrader Universal Tire Pressure Gauge



you can keep your tires inflated to the right pressure.

Price, $1.25

At all dealers everywhere.

A. Schrader's Son, Inc.
BROOKLYN, N. Y.
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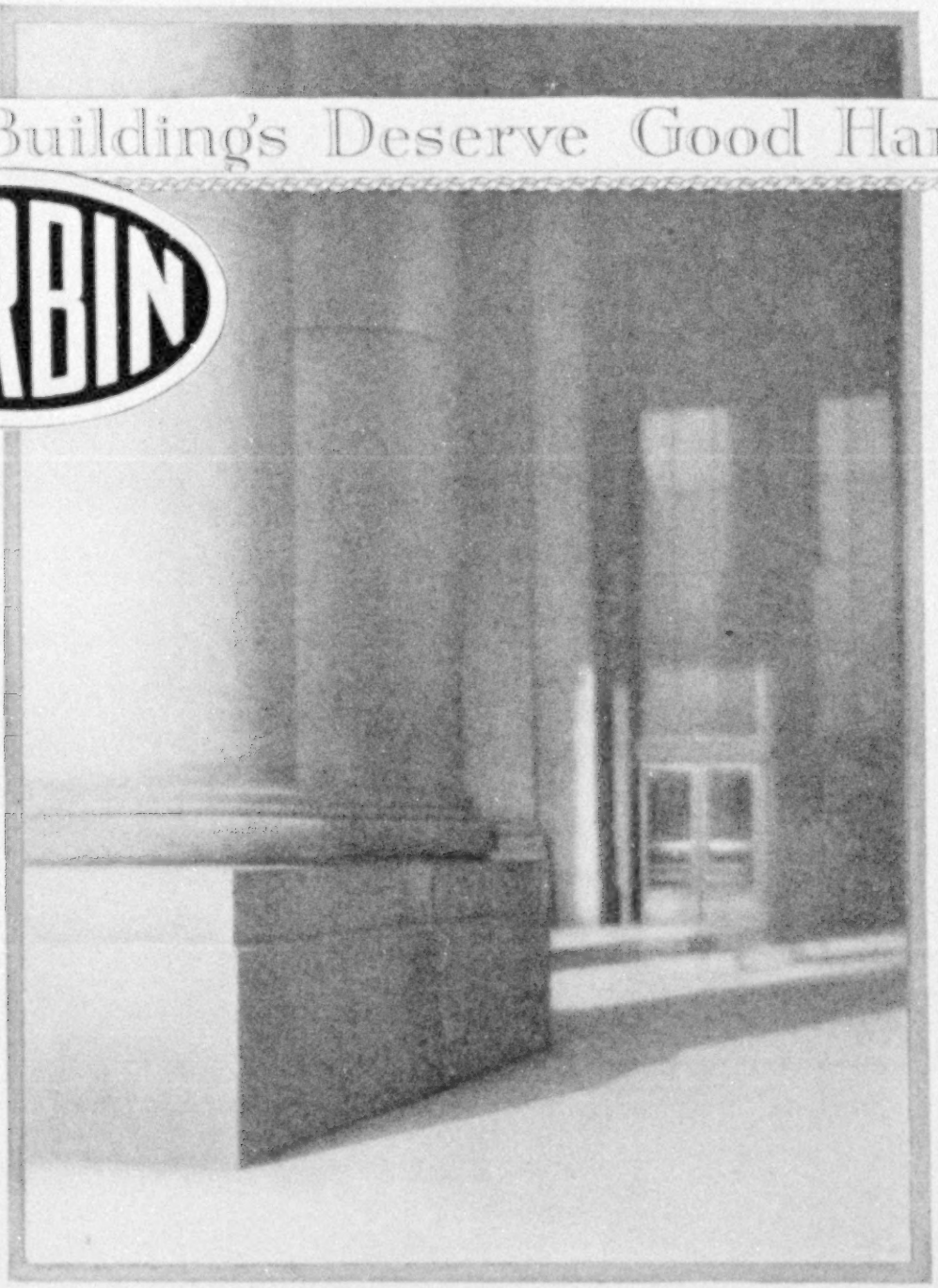
Good Buildings Deserve Good Hardware

CORBIN



Photograph by Clara E. Sipprell

Main approach to Pennsylvania Station, New York.

This monumental and useful building has good hardware—Corbin.

The finest buildings *have* Good Hardware

IF you examine the hardware in the fine buildings of your community, you will find that much of it is Corbin.

Corbin butts and hinges help the doors to swing smoothly. Corbin door-checks close them without slamming. Corbin locks lock them securely. Corbin master-key systems guard thousand-room hotels, thirty-story office buildings, government and institutional buildings and more residences than you imagine.

In theatres, schools, factories and auditoriums, Corbin fire exit fixtures stand ready to release doors instantly in response to the slightest pressure. When the emergency comes, *they work.* Therein lies the true worth of Good Hardware —*it works.*

Corbin hardware not only *works.* It *lasts.* You can say to yourself, when you put it in your home, "This hardware is a part of the house and always will be."

Are you about to build? Give to hardware the attention it deserves. Nothing reflects the character of a building, or the good taste of its owner, so surely as the hardware. Your architect will not allow you to skimp on the hardware. He knows that Good Buildings deserve Good Hardware.

Write for booklet, "Good Buildings Deserve Good Hardware."

P. & F. CORBIN SINCE 1849 NEW BRITAIN CONNECTICUT

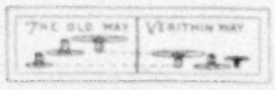
The American Hardware Corporation, Successor

NEW YORK CHICAGO PHILADELPHIA

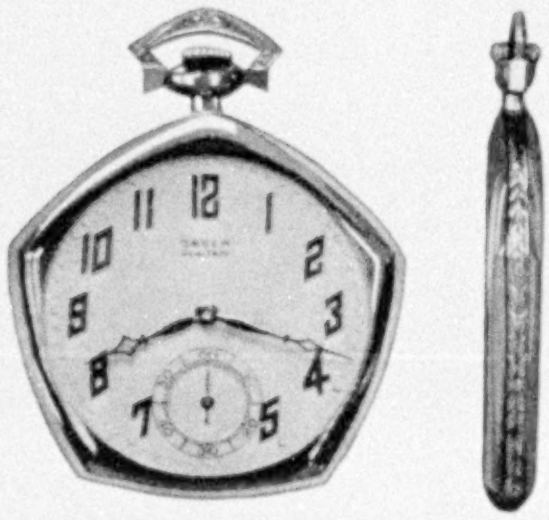
XUM

THE Pentagon, the newest Gruen Verithin, is a beautiful example of guild craftmanship. Fitted with the famous Gruen Precision movement, and guaranteed to come within railroad time requirements, it gives the highest timekeeping perfection obtainable.

GRUEN WATCHMAKERS GUILD
Time Hill, Cincinnati, U. S. A.
Canadian Branch, Toronto
Masters in the art of watchmaking since 1874



How the Gruen Pat. Wheel Construction made an accurate watch logically thin. It isn't a genuine Verithin unless it is a Gruen



It won't tip over in the pocket.

No. A51—Pentagon (shape patented) 14 kt. solid green gold, engraved center edge, $100.00. At the leading jewelers.

GRUEN Guild Watches

Including the original and genuine "VERITHIN" model

Copyright, 1922, The Gruen Watch Co.

DUES

Annual membership in U. S., $3.00; annual membership abroad, $4.00; Canada, $3.50; life membership, $100. Please make remittances payable to the National Geographic Society, and if at a distance remit by New York draft, postal or express order.

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To the Secretary, National Geographic Society,
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I nominate .....

Occupation .....
(This information is important for the records.)

Address .....

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for membership in the Society

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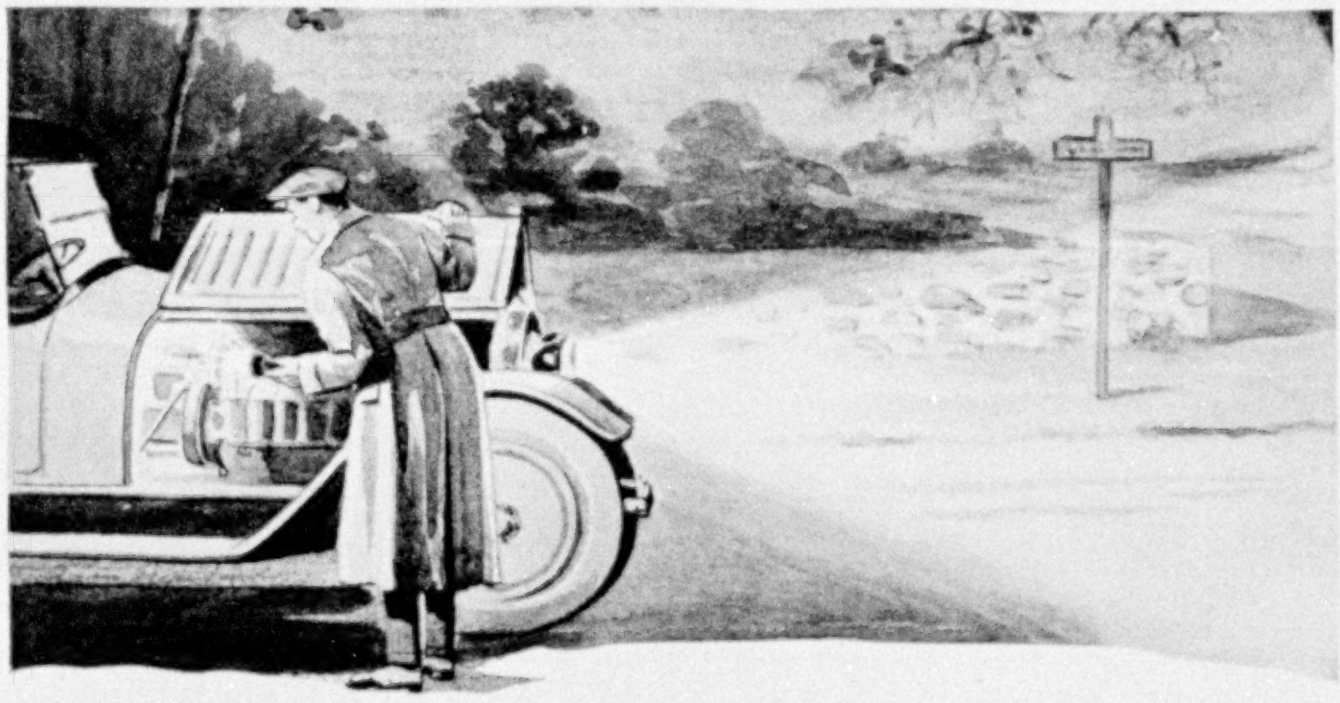
Name and Address of Nominating Member

5-22



A Clog in The Carbureter— A Lonely Road—And a Dark Night

A very little thing can paralyze the mechanics of an engine, and bring annoyance and hardship.

Everyone realizes the necessity of taking care of a machine, and of taking warning when it "knocks."

Yet some people expect the body to take care of itself, though its mechanism is far more delicate and complicated than that of any mechanical device.

Carelessness in selecting food, and neglect of warnings has stalled many a human machine when the trip was far from finished.

Grape-Nuts feeds the body scientifically, and it has a wonderful charm for the appetite. The full richness of wheat and malted barley, together with the vital mineral salts which the blood corpuscles and bone structure must have are in this food; and Grape-Nuts is so processed in the making, that it digests quickly and completely.

Try Grape-Nuts with cream or good milk for breakfast, or in place of a heavy, starchy meal for lunch. You'll greatly relish the delicious crispness and flavor of this splendid food, and you will be helping yourself to better health—away from the danger of accidents along the road.

Grape-Nuts—the Body-Builder

"There's a Reason"

How This House Was Heated

Fresh, wholesome air is essential to the successful and healthful heating of any home. The moment your home becomes permeated with air contaminated by fire gases and poisons, that moment does your heating plant cease to serve and begin to destroy.

Any home can be comfortably heated, yet amply supplied with fresh, pure air, gently heated to the proper temperature by the use of the

"FARQUAR"
SANITARY HEATING SYSTEM

Four facts which make the FarQuar System Distinctive—

—a one-piece electrically welded steel fire-box which positively prevents the escape of gases or the contamination of the warmed air.

—a storage fire-box with large grate area, insuring slow combustion, hence full efficiency of fuel.

—an automatic control, of which the actuating member is the fire-box itself, thus giving accurate regulation and absolute control of fire in all kinds of weather.

—a vent and return system which insures a generous supply of gently warmed, pure, fresh air, instead of a hot blast of superheated air.

"The Science of House Heating," an attractive booklet for home-owners, tells many interesting facts about healthful heating and ventilating. Write for a copy.

THE FARQUHAR FURNACE CO.

905 FarQuar Building — Wilmington, Ohio

The Story Told by the Owner

John B. Sokup, Cincinnati, Ohio

Here is a letter Mr. Sokup wrote in 1909:

"The FarQuar Steel Self-Regulating Furnace fully meets every requirement. The self-regulating device never fails to operate. My home is comfortable at all times. I fully believe it has saved me many dollars in doctor and coal bills. 'The FarQuar' certainly does all that you claim for it."

Then in July, 1921, 12 years later, he wrote this letter:

"The FarQuar Furnace installed fifteen years ago has given entire satisfaction. For the first eight years we used Coal and for the last seven years have used Gas. It is economical with either fuel. We have never found it necessary to make any repairs since the furnace was installed, and it is in perfect condition today. It surely is a pleasure to recommend an article that has given such entire satisfaction."

Dodson Bird Houses

See what the wren eats

Joseph H. Dodson
President, American Audubon Association

Do away with costly insect pests—

Why not write to Mr. Dodson? He will gladly tell you how to rid your grounds of costly insect pests by attracting the birds. Years of loving study have perfected Dodson Bird Houses. A regard for little details, even ventilation, determines whether birds will occupy a house. And amid the modern devastation of nature, the little birds need homes made for them. Hang one of these quaint houses from a limb, tack one to a tree, put one up on a post! They will attract the birds.

JOSEPH H. DODSON

702 Harrison Avenue — Kankakee, Illinois

WREN HOUSE is but one of many bird houses. Solid oak, cypress shingles, copper coping, with four compartments. $5.00

FREE Mr. Dodson's fascinating booklet, "Your Bird Friends and How to Win Them." Just write for it.

A Garden Full of Dahlias for $3.50

New and Rare Exhibition Dahlias

Few flowers, whether used for garden decoration or principally for cut blooms to decorate the home, are as responsive to simple garden culture as our Modern Dahlia. It has made wonderful advancement in size of bloom, habit of growth and profuse blooming qualities.

In order to further its now great popularity, we are offering this collection of

12 Dahlia Tubers for $3.50

—one each of 12 distinct varieties, not labelled, which if purchased separately according to name would cost not less than $10.

Order Your Tubers Now so as to have them ready to plant any time after the tenth of May or when all danger of frost is past.

Mail this advertisement with check, money order, cash, or stamps, and secure this exceptional collection, sent prepaid to any point in the United States.

Our 1922 Spring Seed Annual sent on request

Stumpp & Walter Co

30 and 32 Barclay Street — New York

Wash and Bathe in Running Water

After All—
the Really *Clean* Bath is the Shower
—and this is the Ideal Installation

But then, a shower doesn't only make you *clean*—When you are physically or mentally tired, or both, the impact of scores of sparkling sprays of clean, fresh water, renews jaded nerves and relieves fatigue.

In the morning, your shower takes only a couple of minutes and then you have a two hour start on the day. And at bedtime, a gentle, warm shower often assures quiet, restful sleep.

However, shower pleasure is even greater when you can anticipate it—when you know that your shower will work unfailingly.

Your plumber, dealer or architect will tell you about Speakman Showers—their quality. In the illustration is the Speakman H952½ Mixometer Shower and Deshler Bath Fixture over a built-in tub. The Mixometer controls the temperature of the water instantly. It has been used successfully for many years in residences, hotels, clubs and institutions.

The H952½ shower, like other Speakman Mixometer Showers, has the Speakman Anyforce Head. It allows the bather to control the shower's force with half a turn of the lever. When you talk with your plumber or dealer ask him for a Speakman shower folder—or write us.

SPEAKMAN COMPANY, Wilmington, Delaware

SPEAKMAN SHOWERS

XUM

Rock Island

Reduced Fares Colorado and West!

The most attractive fares that have been offered in years will enable you to make that long-deferred vacation trip at a very moderate cost this Summer.

Rocky Mountain Limited

One night only between Chicago, Denver and Colorado Springs. Other fast Rock Island trains, the **Colorado Express** and **Colorado Flyer**. Only direct line between the East and **both** Denver and Colorado Springs.

Golden State Limited

Fast, luxurious, dependable! Daily between Chicago, Los Angeles and Santa Barbara. To and from San Diego, through Imperial Valley and Carriso Gorge.

Yours for the asking: a profusely illustrated, entertainingly written book on Colorado and National Parks. Tells you how to get the most out of a Colorado vacation. Send for it today; and remember, please, that

Comfort and courtesy are your fellow travelers on the

Rock Island Lines

Mail this coupon to-day

Mr. L. M. Allen, Vice President,
Rock Island Lines, 730 La Salle Station, Chicago, Ill.

Please mail me, without charge, your (Colorado / California) book.

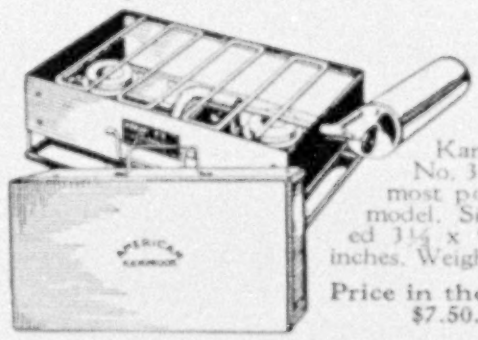
Check the book or books you desire.

Outdoor Appetites

are quickly satisfied if your outing equipment includes an

AMERICAN
KAMPKOOK
THE IDEAL CAMP STOVE

It is the most convenient and dependable stove for motor tourists and campers. Burns the same grade of gasoline you use in your car without smoke, soot or odor. Quickly set up, easy to light, wind proof, safe anywhere. Used by more than a quarter million tourists and campers.



Kampkook No. 3 is the most popular model. Size folded 3½ x 9 x 15 inches. Weight 8 lbs.

Price in the U. S. $7.50.

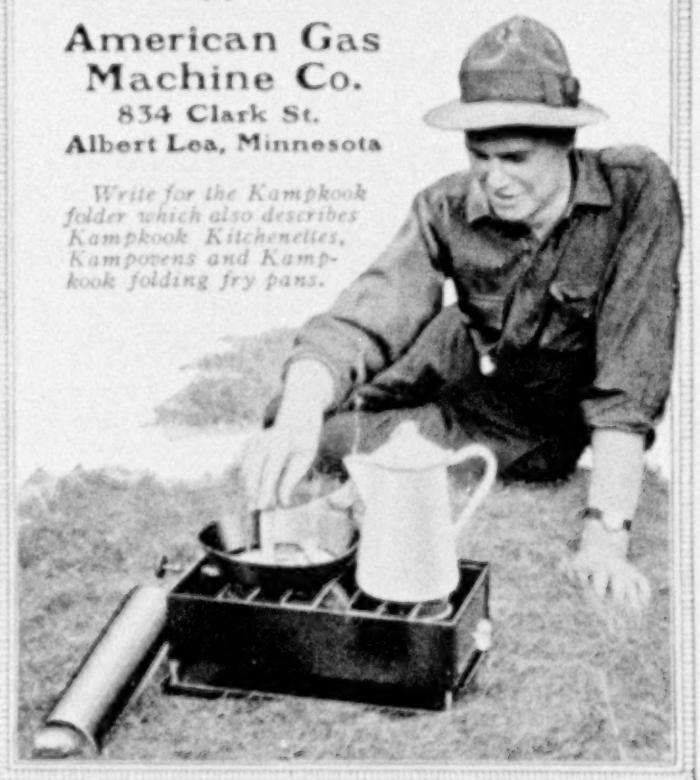
Also made with brass case at $9.50; large size two burner $8.50; three burner size $12.00.

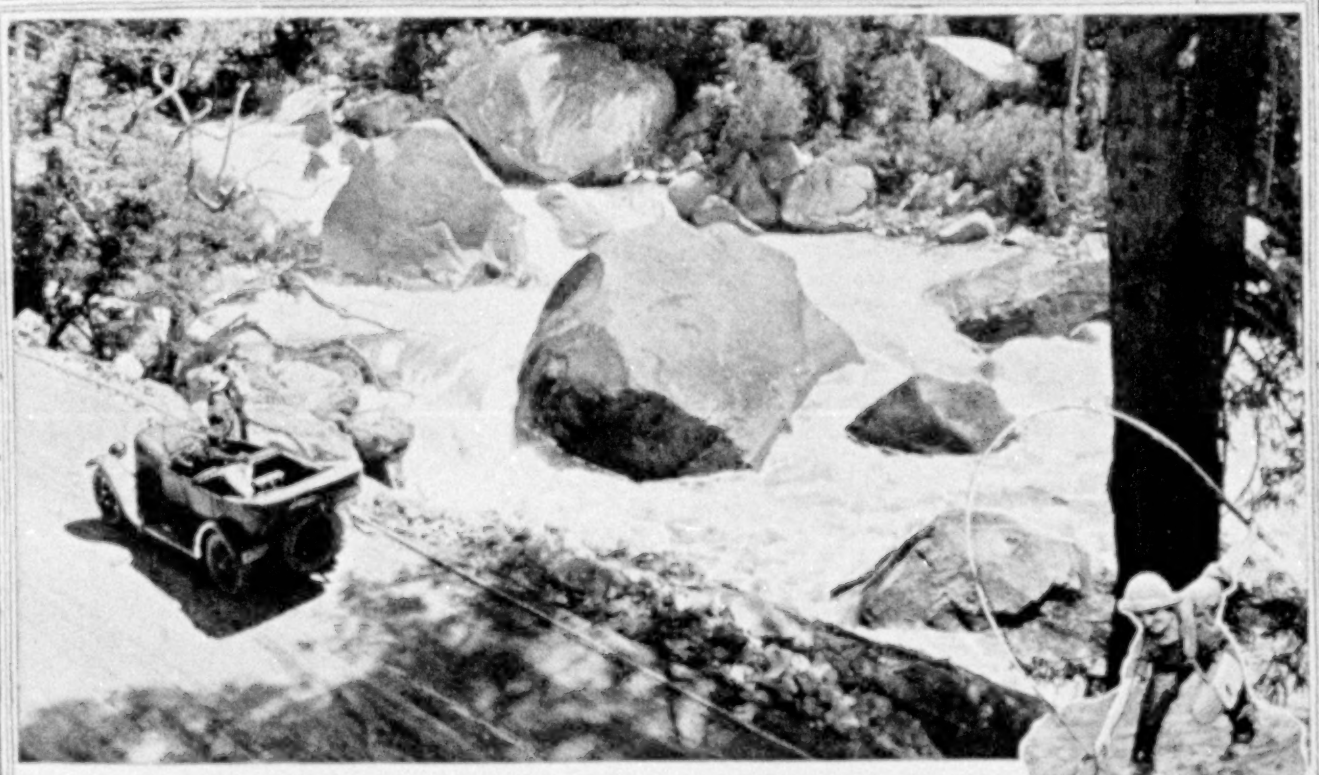
IT'S ALL INSIDE

All Kampkooks fold up like a miniature suit case when not in use with all parts including tank securely packed inside the case.

American Gas Machine Co.
834 Clark St.
Albert Lea, Minnesota

Write for the Kampkook folder which also describes Kampkook Kitchenettes, Kampovens and Kampkook folding fry pans.





Here You're at Your Best

no matter what you wish to do.

By A TRAVELER

A "Southern California Summer" is an experience that you, perhaps, have yet to enjoy. I have enjoyed many since I first heard of their almost unbelievable attractions. Ninety nights in June, July and August *under blankets* is the rule.

A friend once amazed me with that statement. I had never been to California. But I travel widely, and once went there—to see for myself.

I've spent seven summers there since then.

In no other land are there so many different diversions and strange sights. And nowhere else, it seems, do you *feel* as you do here.

You're at your best in golf and every other sport. It's in the air. And there's interesting changes wherever you may turn.

Lunch on a great desert like Sahara. Dinner that evening in a famous restaurant in one of the world's large cities. The same evening, a visit to the seashore.

4,000 miles of paved highways, smooth as city streets, to take you to these places.

You fish in mountain lakes or streams, rest at mountain camps, ride horseback over wild trails, bathe at a seashore resort at the foot of a mountain range.

Such is this great summer playground from end to end.

Stupendous hundred-mile views are everywhere on clear days from many points.

And all these diversions within a radius of a hundred-mile drive over perfect roads.

Add these attractions to an ideal summer climate—warm days and nights that are *really cool* and you have not an imaginary summer wonderland, as this may seem, but one *in fact*.

Southern California is America's ideal summer as well as winter resort. Average mean temperature: June, 66 degrees; July, 70 degrees; August, 71 degrees; September, 69 degrees.—The 44-year record of the U. S. Weather Bureau.

Summer? An amazing summerland—you'll never spend a more delightful, restful, interesting summer anywhere. Best of all, you'll have this *complete change!* And in that feature is the *real value* of vacations.

Ask any railroad ticket office for further information, or mail coupon below.

Special, low-rate, round trip fares beginning May 15th—*No more War Tax.*

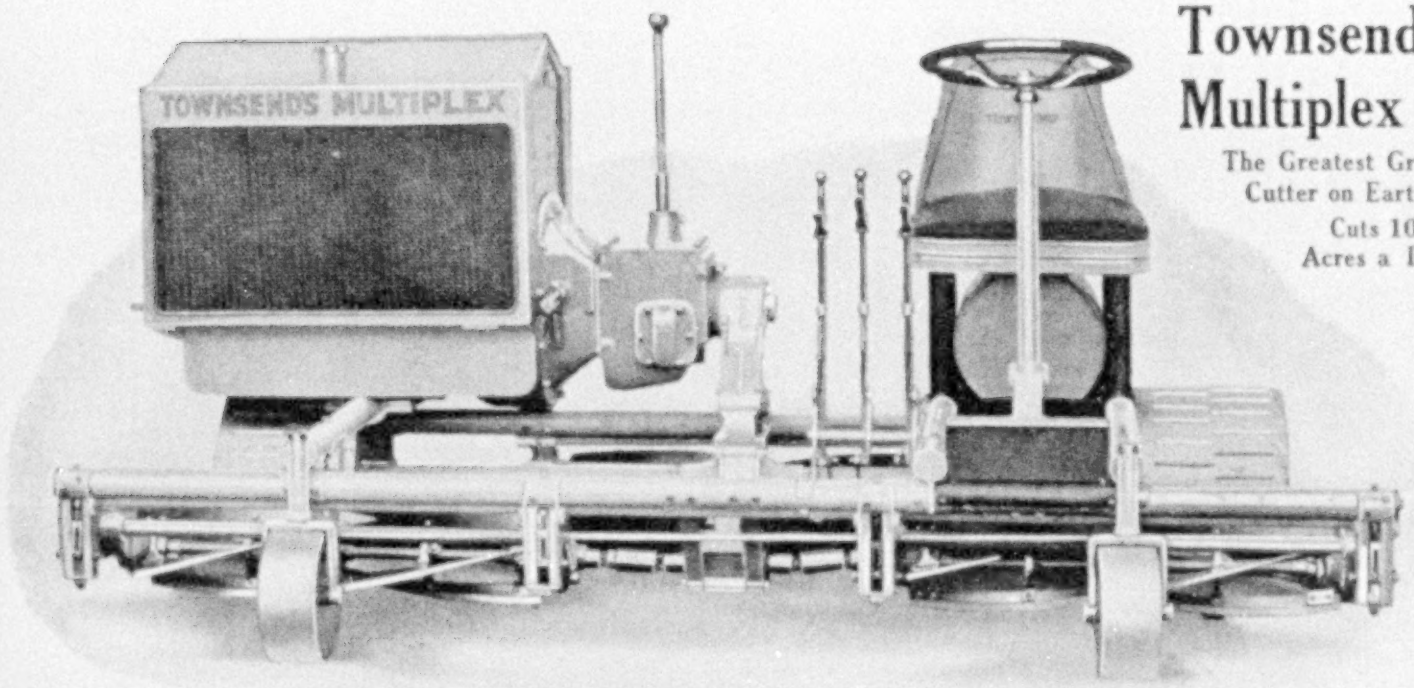
Plan now for this summer. Let the family have this great change and great trip.

All-Year Club of Southern California,
Dept. M-1005, Chamber of Commerce Bldg.,
Los Angeles, Calif.

Please send me full information about the summer vacation possibilities in Southern California.

Name.....

Address.....



Townsend's Multiplex

The Greatest Grass-Cutter on Earth.

Cuts 100 Acres a Day.

Cuts a Swath 12 Feet, 114 Inches, or 86 Inches Wide

Floats over the uneven ground as a ship rides the waves. One unit may be climbing a knoll, another skimming the level and another paring a hollow.

Not an assembly of tractor and mowers, but a single, compact machine like an automobile, with 3, 4, or 5 cutting units.

Driven by a 17 H. P. four-cylinder, water-cooled gasoline motor of great power and quality with Splitdorf Dixie Aero Magneto, a wonderful radiator, sliding gear transmission, two speeds, forward and reverse, etc.

Can also be drawn by horse, the motor being removed, or converted into a powerful tractor by detaching the cutting units.

Can back up or turn a complete circle in double its width. Can stop in six inches—it has a powerful brake—the only one that has. This is vital.

It has not a single cog wheel in its cutting units and but few elsewhere, and those few very strong.

The cutting units are controlled from the driver's seat. Throw them *in* gear, throw them *out*, *raise* them, *lower* them—all with a tiny lever at your right.

Do we *guarantee* it? Write your own.

Send for catalogue illustrating all types of TOWNSEND MOWERS.

S. P. TOWNSEND & COMPANY 254 Glenwood Avenue, Bloomfield, N. J.

Just once in 10 years can you see Oberammergau—book through GATES TOURS

THIS solemn religious festival, enacted almost continuously every decade since 1633, is to be revived during May June, July and August of 1922. Special Gates Tour Bookings will insure your seeing this stirring spectacle and give you, in addition, a visit to 36 other old world cities. Optional dates of return and extensions may be arranged.

Gates European Tours $395 and up

Tours ranging from 30 to 90 days are listed, costing from $395 upwards. Gates tours founded in 1892, eliminate tourist troubles and annoyances and provide world travel at moderate rates and in the company of congenial companions

Apply direct or to Raymond & Whitcomb Co., General Agents in New York, Boston, Chicago, Philadelphia, Detroit and Toledo.

Write for Booklet "C-12"

All Gates Tours include, without extra cost, Paris, the Argonne and other American Battlefields.

GATES TOURS — *Founded* 1892

"World Travel at Moderate Rates"

225 Fifth Avenue, New York
London—Paris—Rome

All the year 'round- YOSEMITE National Park!

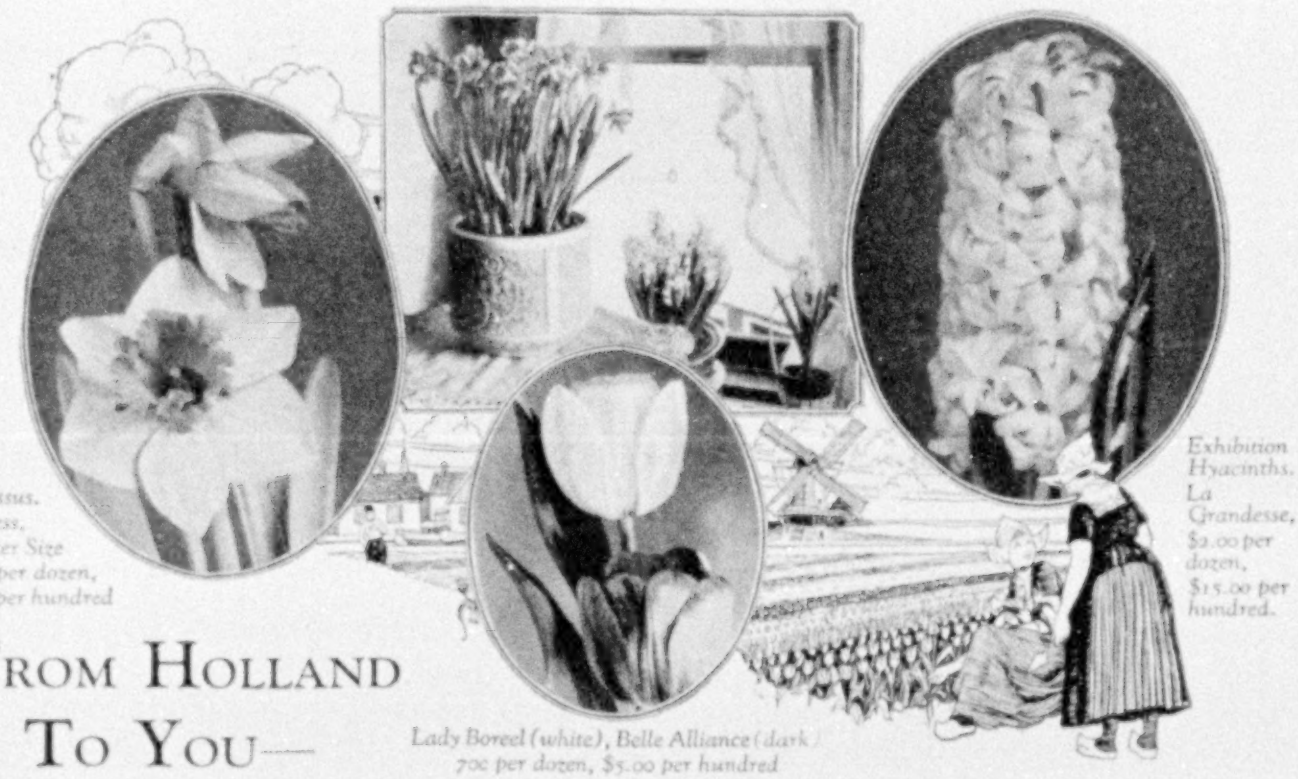
—in California—

Every month in the year, Yosemite National Park, in California, extends its welcome to all travelers, to enjoy the exceptional beauty and majesty of its world-famous natural wonders,—its motor tours, trail riding, summer and winter recreations, and mountain climbing.

The new, three day "Y T S" tour, 156 miles by rail and 240 miles by motor stage, offers a special attraction this year, between June 1 and October 1, reaching all main points of interest, including Merced River Canyon, Yosemite Valley, Hetch Hetchy Valley, Inspiration Point, Mariposa Grove of 600 Big Trees, Wawona Point, and, (after June 15) Glacier Point and Overhanging Rock, at a cost of $35.00 for round trip transportation from Merced, California, where all main line railroad tickets permit free stopovers.

See Yosemite this year. Write today for free Illustrated Descriptive Folder. Address

YOSEMITE NATIONAL PARK CO.
Dept. "G" Yosemite, Calif.



Narcissus. Empress. Monster Size $1.00 per dozen, $7.75 per hundred

Exhibition Hyacinths. La Grandesse, $2.00 per dozen, $15.00 per hundred.

Lady Boreel (white), Belle Alliance (dark) 70c per dozen, $5.00 per hundred

From Holland To You—

THE WORLD'S BEST BULBS

Every year from this toyland of painted roofs, wandering dikes, and sky-blue tiles we import bulbs of unequalled quality and of many varieties, bringing color and fragrance to flower-lovers all over America.

Because of our long experience and many visits with the best Holland horticulturists we are able to obtain for you their finest products at a reasonable cost.

Bulbs Mean Flowers in Your Home or Garden

A glance at our price list will show you that for a few cents each you can grow hyacinths, tulips and narcissi which would cost $1.00 a plant or more in a retail shop. Grown in the home they will brighten your rooms from Christmas to Easter.

The bulbs require very little care. Simply plant them in soil from your garden, or use soil from a florist's shop if you live in the city. Keep them in a cool, dark place and water them occasionally until they are well rooted. Then bring them out to the light at intervals of ten days so that you may have a succession of flowers. When the buds are ready to open, you may transplant the bulbs to jardinieres, fern dishes, or bowls if you wish.

Why You Should Order Now

We import bulbs to order only and we must have word **not later than July 1st.** By ordering at once you get a special discount on a quality of bulbs not usually to be obtained in the United States at any price. Delivery will be made by the end of September or early in October.

Bulbs need not be paid for until after delivery

Send At Once For Beautiful Free Booklet

Attractively illustrated in color, showing a thousand varieties of bulbs and giving complete instructions for growing them successfully in either your house or garden. Or better still, order now from the accompanying list and we shall send the booklet at once and fill your order as soon as possible after the bulbs arrive from Holland.

Our reputation as one of the oldest and most reliable seed, shrub, and plant houses in America is a guarantee of fairness and satisfaction. Order your bulbs today.

A FEW SPECIAL PRICES

If Ordered Before July 1st

		Doz.	Hund.
Exhibition Hyacinths			
La Grandesse	Pure White	$2.00	$15.00
Grande Blanche	Blush White	2.00	15.00
La Victoire	Brilliant Red	2.00	15.00
Rosea Maxima	Delicate Blush	2.00	15.00
Enchantress	Light Blue	2.00	15.00
City of Haarlem	Best Yellow	2.00	15.00
Second sized Hyacinths in all best varieties		1.50	11.00
Miniature Hyacinths in separate colors		.70	4.75
Tulips			
Mon Tresor	Yellow	.85	6.00
Belle Alliance	Scarlet	.70	5.00
Lady Boreel	Pure White	.70	5.00
Keiserkroon	Red & Yellow	.65	4.50
Rose Grisdelin	Beautiful Pink	.65	4.50
Narcissi or Daffodils			
Paper White	Monster Sizes	.75	5.00
Golden Spur Select	Rich Yellow	.75	5.50
Emperor	Yellow	1.00	7.75
Empress (Monster Sizes)	White & Yellow	1.00	7.75
Von Sion (Monster Sizes)	Double Yellow	1.00	7.00
Poeticus Ornatus	White	.55	3.50
Sulphur Phoenix	Yellow & White	.80	5.50

ELLIOTT NURSERY CO.

Established 35 years

519 Magee Bldg., Pittsburgh, Pa.

Our bulb business is one of the largest in the world

Mail This Coupon Today

Elliott Nursery Co.,
519 Magee Bldg., Pittsburgh, Pa.

Kindly send me Free Booklet about Imported Dutch Bulbs with full directions how to grow them in house and garden.

Name .....

St. and No. or R. D. .....

City State

XUM

Shawknit

TRADE-MARK

REG. U. S. PAT. OFF.

HOSIERY *for* MEN

SHAWKNITS prove that socks can look well and wear well. Both these qualities appeal to the sensible man. There is no reason for sacrificing either essential.

SHAW STOCKING CO.
Lowell, Mass.

Prove "Wear-Ever" Quality on Your Own Range
See for yourself how thick, hard and dense "Wear-Ever" utensils are! Learn what thoroughly satisfactory service they give!

"Wear-Ever"

SEVEN INCH Aluminum Fry Pan

Regular Price $1.10 *(Except in West and South where price is higher)*

60c and Coupon

For limited time, dealers are authorized to sell this seven-inch fry pan for 60 cents and coupon.

If unable to obtain one at your dealer's, mail us this coupon with 60 cents and we will send you a pan postpaid.

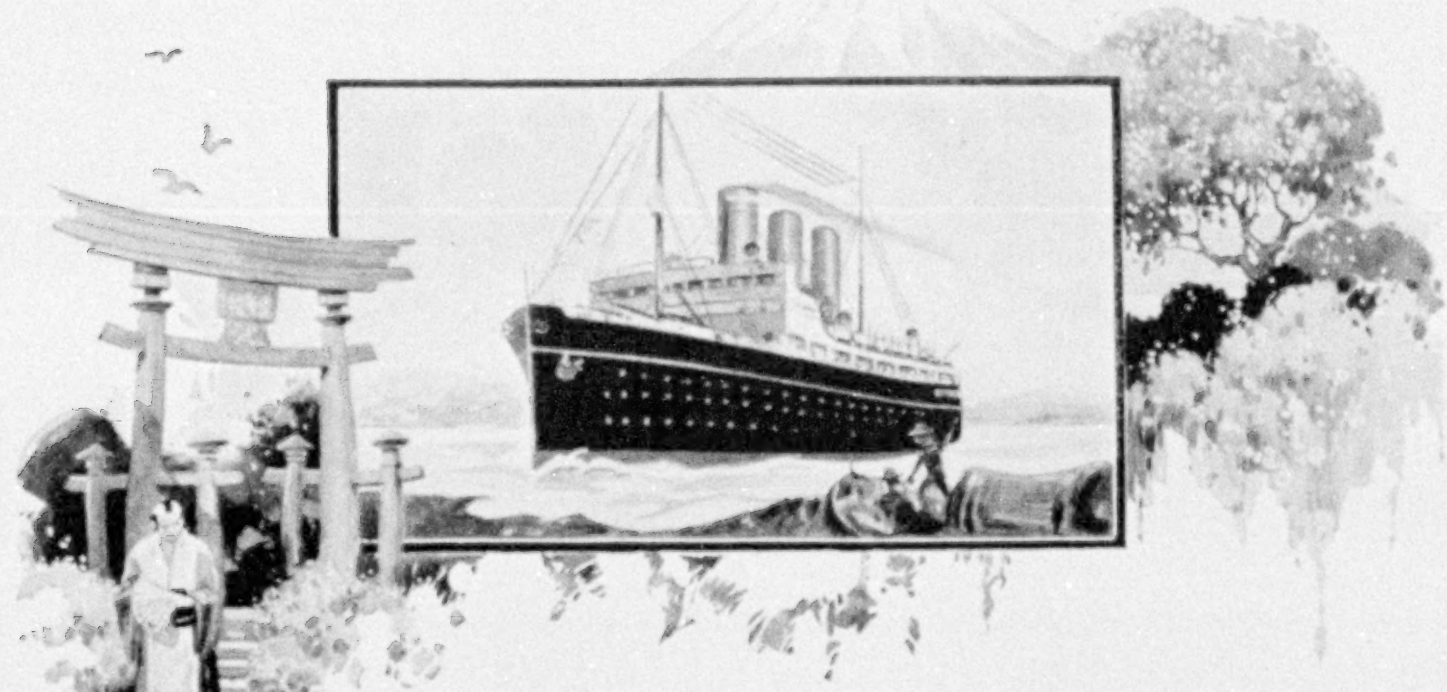
The Aluminum Cooking Utensil Co.
Dept. 80, New Kensington, Pa.
In Canada, Northern Aluminum Co., Ltd., Toronto, Ont.

A seven-inch "Wear-Ever" fry pan will be sent postpaid anywhere in U.S. or Canada if not obtainable of your dealer, on receipt of 60c. Send 20c additional for cover. Dept. 80.

Name .....
Address .....

The Canadian Pacific Route

Bridging two oceans and linking four continents



Fortnightly Service TO THE Orient

Fastest Time Across the Pacific

FOUR magnificent Canadian Pacific Empress Steamships, the largest, fastest and most luxurious on the Pacific will link Asia with America this year.

Empress of Canada	-	*33,000 tons displacement*
Empress of Australia	-	*31,000 tons displacement*
Empress of Russia	-	*25,000 tons displacement*
Empress of Asia	- -	*25,000 tons displacement*

The Canadian Pacific Empresses hold the record for the fastest time to the Orient. The new, palatial *Empress of Canada* and *Empress of Australia*, now to be linked with the well known and popular *Empress of Russia* and *Empress of Asia*, are marvelous achievements of modern science and marine architecture. They possess individually the grandeur, speed and perfection of appointments that make them easily the choice of discriminating travelers.

Japan, China and the Philippines

There will be a Fortnightly Service from Vancouver, B. C., via Victoria.
The new *Empress of Canada* is scheduled to make her maiden voyage June 29th.

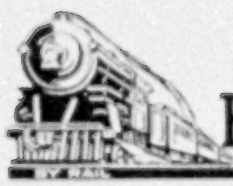
Plan your trip now to Japan, Korea and Manchuria. See Fujiyama, visit the Forbidden City of Pekin, the great Oriental ports of Shanghai, Hong Kong and Manila.

As easy as a trip to Europe

For rates and full information about your ocean and rail trips

Ask the CANADIAN PACIFIC

NEW YORK, N. Y.—Madison Ave., at 44th St.
MONTREAL, CAN.—141 St. James St. CHICAGO, ILL.—40 N. Dearborn St.
Canadian Pacific Offices All Over the World



Before you plan a journey see a Canadian Pacific Agent

MAJESTIC

The World's Largest Ship

White Star achievement in providing utmost ocean comfort is symbolized in the world's largest and newest steamship—*Majestic*—which takes her place this spring in our service to Cherbourg and Southampton.

This 56,000-ton ship, the superb new 34,000-ton *Homeric*, and the magnificent *Olympic*, whose fame is already world-wide, form a *mighty trio* to maintain regular weekly sailings from New York.

Regular weekly sailings to Liverpool via Queenstown with the *Adriatic*, *Baltic*, *Celtic*, and *Cedric*, each over 20,000 tons. This service appeals especially to families and tourist parties. You land near the beautiful Lake District, the Shakespeare Country, and the Mountains of North Wales.

Early bookings are suggested to secure most desirable accommodations.

WHITE STAR LINE
AMERICAN LINE ✓ RED STAR LINE
INTERNATIONAL MERCANTILE MARINE COMPANY

No. 1 Broadway, New York City

Get this valuable Book on Better Lawn Care

Every one interested in the care of large, beautiful lawns should have a copy of this book which tells all about Ideal Power Lawn Mowers. It shows many photos of well-known homes, parks, golf clubs, cemeteries, colleges, etc., where the lawns are cared for the "Ideal Way." It tells about the Ideal Junior, a moderate-priced power mower for medium-sized lawns, the 30-inch Ideal Power Lawn Mower for large lawns, and the Ideal Triplex Power Mower for large parks, golf clubs, etc. Write for this book today—learn how to keep your lawn in better condition at less cost.

IDEAL POWER LAWN MOWER CO.
R. E. OLDS, Chairman
422 Kalamazoo St. Lansing, Mich.
World's Largest Builders of Power Lawn Mowers.
Dealers in all principal cities.

The Ideal Junior

IDEAL Power Lawn Mowers

Sani-Flush

Reg U.S. Pat. Off.

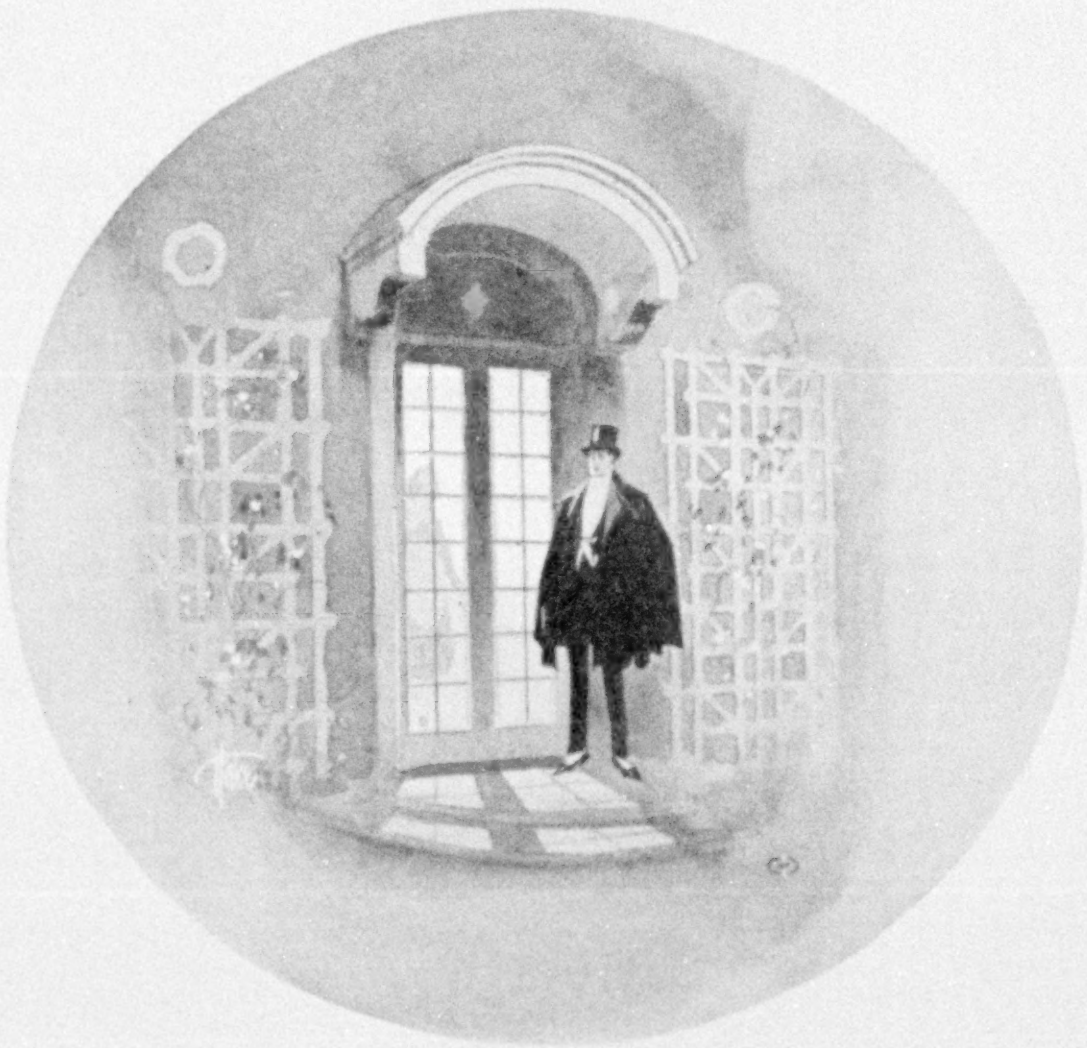
Cleans Closet Bowls Without Scouring

Just sprinkle a little Sani-Flush into the bowl according to directions, and flush. Stains, odors and incrustations vanish. Both bowl and trap become as clean and white as new.

Sani-Flush is sold at grocery, drug, hardware, plumbing and house-furnishing stores. Price, 25c.

The Hygienic Products Co., Canton, Ohio

Canadian Agents
Harold F. Ritchie & Co., Ltd., Toronto



"BUILD OF CYPRESS
the "Wood Eternal"
AND YOU BUILD
BUT ONCE."

Tide Water
Cypress
"The Wood Eternal"

You Both Love to Linger

a moment on your own Cypress door-step to enjoy your own Cypress entrance-hood and those delightful Cypress trellises—and back of your happy pride is the great satisfaction of knowing that your investment is a solid asset, because with "the 'Wood Eternal' all over the place" you're pretty well insured against the repair bill bugaboo. It's a very comfortable feeling. It pays to insist on genuine Tidewater Cypress, the true "Wood Eternal." Ask the lumberman to show you the Cypress trade-mark arrow (shown below) on every board or bundle.

Vol. 28 is the Trellis & Arbor Book. 68 pages. 28 pictures. 23 working plans with specifications. 2 valuable Vine Charts. FREE on request. Write. (Also ask for Vol. 43, a surprise book.)

SOUTHERN CYPRESS MANUFACTURERS' ASSOCIATION

1224 Poydras Building, New Orleans, Louisiana
or 1224 Graham Building, Jacksonville, Florida

Deep Stuff

"A says to B."

Now just why do people buy Old Hampshire Bond?

Says A: "To impress the man to whom you're writing. To make him think you're as good, and your goods are as good, as the paper you write on."

But says B: "Not so. People who buy Old Hampshire Bond aren't that sort of folks. They don't consciously care a hang about impressions—they just naturally want the best. They aren't always thinking about knocking somebody's eye out. They buy fine things because the things *are* fine."

A: "All wrong, old man. Scenery counts like the dickens in getting business. Act the part and you'll land the orders."

B: "*Some* orders, perhaps—but you'll never sell my crowd anything by telling them they ought to wear good clothes, or shave every day, or use Old Hampshire Bond just because it *pays*."

Now, this is getting pretty deep. We lean toward B's point of view, we confess—but perhaps that's because B flatters our vanity.

What do you think?

"B says to A."

For the best ten answers on each side received before May 20, 1922, we will present a $10.00 box of Old Hampshire Bond semi-business stationery, with envelopes to match, neatly engraved with your name and your home or business address.

To every one who writes us a letter on this subject, no matter whether it wins a prize or not, we will send a sample packet of Old Hampshire Bond.

Old Hampshire Bond

Hampshire Paper Company

Old Hampshire Bond

South Hadley Falls Mass.

Your
Casement Windows
to be
Satisfactory
must not slam

MONARCH

Automatic CASEMENT STAY

holds window so securely that even in a storm it will not slam. Can be attached, concealed or exposed, at right or left, top or bottom. Sold by Hardware Dealers everywhere.

Our booklet, "Casement Windows," will prove interesting and helpful—write for copy.

MONARCH METAL PRODUCTS CO.
4900 Penrose St. St. Louis, Mo.

PAINTINGS RESTORED

Over thirty years' practical experience in the restoration of old and modern masters

Injured, defaced, and cracked paintings properly treated

Estimates Furnished

AINSLIE GALLERIES
Established 1885
615 Fifth Ave., New York

Twenty INNESS Paintings on Exhibition at Our Galleries

THE GLEN SPRINGS
WATKINS GLEN, N. Y.
ON SENECA LAKE
William E. Leffingwell, President
Offers Intelligent Rest. Facilities for scientific examination and treatment. Hydrotherapy, electrotherapy, mechanotherapy. Nauheim Baths given with natural calcium chloride brine. In beautiful Finger Lakes Region of central New York. All sports. Booklets on request.

Learn What "Elbow-Room" Really Is!

DIP into vast Alpine Meadows on the slopes of Mount Rainier—ride along the spectacular Columbia River Highway. Sweep the entire length of your own enormous Pacific Northwest, following the route of "2000 miles of startling beauty."

Northern Pacific Ry.

Fares 28% Lower Than 1921

Variety is the keynote. You'll see great forests, beautiful Lakes, the Rocky and Cascade Mountains, the Inland Empire, as well as the interesting cities of St. Paul, Minneapolis, Butte, Helena, Spokane, Portland, Tacoma, Seattle, Vancouver, Victoria.

$86 Round Trip—Chicago to North Pacific Coast

There's health and a jolly good time awaiting you—wonderful food, superb hotels—everything you want to make a real vacation.

Stop at Yellowstone Park Enroute

North Coast Limited—
All-steel Crack Train of the Northwest.
Leaves Chicago 10:10 a. m. daily.

NORTHERN PACIFIC
YELLOWSTONE PARK LINE

Write for free books, describing the wonders of the Great Pacific Northwest—as fascinating as fiction.
A. B. Smith, Passenger Traffic Mgr., St. Paul, Minn.

Send the Coupon

Chamberlin Metal Weather Strip Co., Detroit, Mich.

Tell me the cost of equipping my building with Chamberlin Metal Weather Strips (check whether home, factory, office building, church, school).

Give number of outside doors_____

windows_____

*Name*_____

*Address*_____

*City and State*_____

Eng. Dept. No. 43

End Draughts Keep Warm Save Fuel

Chamberlin Metal Weather Strips are used on 85% of all weather-stripped buildings, including homes, office buildings, schools, churches, banks, stores, hotels, hospitals, and apartments.

Why Heat Your Building 36 Times Every Day?

Tests show the inrush of cold air at unprotected windows and doors fills the average building 36 times daily. Why fight this with fuel?

How much more simple to bar it out as thousands of good home managers do, with Chamberlin Metal Weather Strips.

Their small cost will surprise you. And think of the comfort they give—the fuel saved—the protection against dust, soot and dirt constantly sifting in. Redecorating is not a yearly necessity in homes or apartments protected by Chamberlin Metal Weather Strips. Curtains and furnishings stay clean longer. More than 10,000,000 doors and windows are Chamberlin equipped.

No cold air currents. Children are safe. Draughts don't drive you from the bright, cheerful spots around the windows. Street noises are excluded. Ends rattling, squeaking doors and windows.

Free Chamberlin Metal Weather Strips are always installed by our own experts. This service is included in our estimate. They are guaranteed to last as long as the building. An estimate by our engineering department is free. Just send the coupon.

CHAMBERLIN METAL WEATHER STRIPS
"SINCE 1893-THE STANDARD"

Moto-Mower

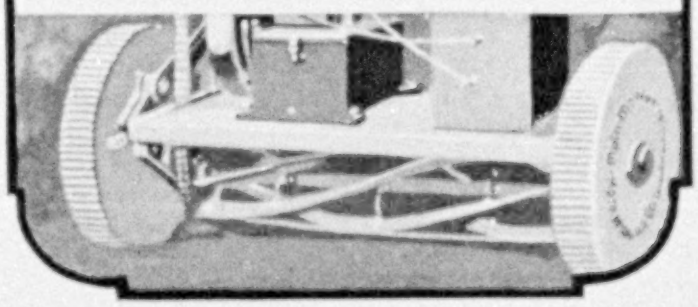
TRADE MARK

IF you have grass to cut on anything larger than a small city lot, write today for the new Moto-Mower Catalog. It will show you how, for an investment of only $210 for the 27-inch machine, you can do your mowing with only one-fifth of your present cutting time and costs.

It will describe this wonderful Moto-Mower—the simplest, sturdiest machine on the market—only eleven moving parts. Used on hundreds of the country's leading parks, cemeteries, and private estates.

Write today for the catalog and have your machine in time to begin spring cutting.

THE MOTO-MOWER COMPANY
3248 E. Woodbridge St., Detroit, Mich.



COOK'S
TRAVELERS' CHEQUES

In Dollars or Pounds Sterling

SAFETY - LIQUIDITY - CONVENIENCE

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is realized in the "Highlands of Ontario"—Algonquin Park—(Alt., 2,000 ft.)—Muskoka Lakes—Great Lakes—30,000 Islands Georgian Bay—Lake of Bays—Kawartha Lakes—Timagami—Nipigon—Quetico—Minaki. Fishing, Boating, Bathing, Golf, Camping, and Finest Hotels. Hay fever unknown.

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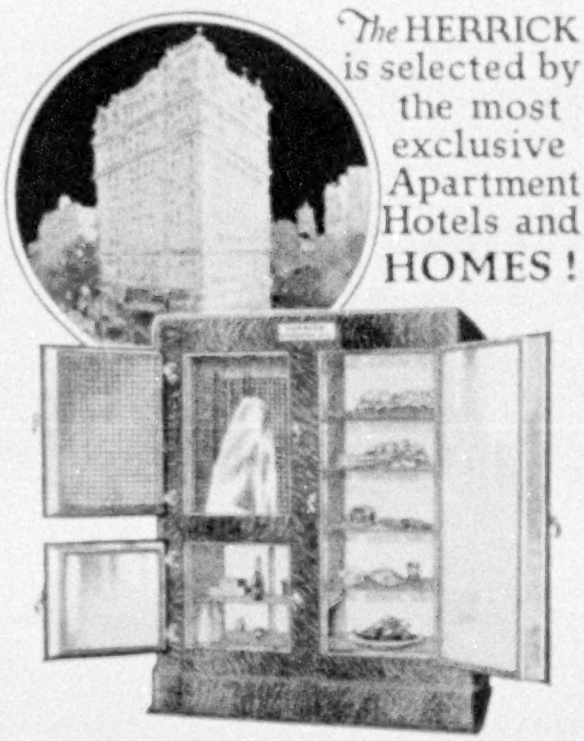

The HERRICK is selected by the most exclusive Apartment Hotels and HOMES!

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The chosen refrigerator for $10,000 per year apartments is just as available for the most humble home. You can enjoy these *quality* features at ordinary refrigerator cost:

1. *HERRICK Cold Dry Air Circulation* keeps interior dry and clean. Keeps food fresh.
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--MEMO for FREE BOOKLET--

"FOOD SAFETY" tells proper way to arrange food in any refrigerator and describes specific advantages of the HERRICK. Send now or clip this memo as a reminder to write soon.

HERRICK REFRIGERATOR COMPANY
205 River Street, Waterloo, Iowa

Food keeps BEST *in the*
HERRICK
THE ARISTOCRAT OF REFRIGERATORS

The dread Pyorrhea begins with bleeding gums

PYORRHEA'S infecting germs cause many ills. Medical science has proved this.

Many diseased conditions are now known often to be the result of Pyorrhea germs that breed in pockets about the teeth. Rheumatism, anaemia, nervous disorders and other diseases have been traced in many cases to this Pyorrhea infection.

Don't let Pyorrhea work its wicked will on *your* body. Visit your dentist frequently for teeth and gum inspection.

And watch your gums yourself. Pyorrhea, which afflicts four out of five people over forty, begins with tender and bleeding gums; then the gums recede, the teeth decay, loosen and fall out, or must be extracted to rid the system of the poisons generated at their base.

Forhan's For the Gums will prevent Pyorrhea—or check its progress—if used in time and used consistently. Ordinary dentifrices cannot do this. Forhan's keeps the gums hard and healthy—the teeth white and clean. Start using it today. If gum-shrinkage has set in use Forhan's according to directions and consult a dentist immediately for special treatment.

35c and 60c tubes in U. S. and Canada.

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250 Matchless Color Pictures

The delight of young or old who would identify, attract, photograph, and fully enjoy their feathered neighbors :: ::

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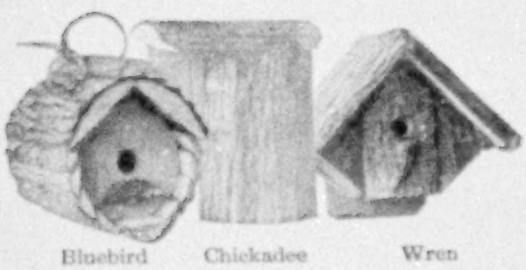

Bluebird Chickadee Wren

Rustic Cedar Bird Houses Do Not Require "Weathering."

Your choice of 3 for $5.00. Parcel Post weight of 3 is 10 lbs. Unbounded pleasure in birds. Add value to any estate. Crescent Sparrow Trap (our Pat.) $5.00.

Robin Wren Bluebird

CRESCENT COMPANY, "Birdville," Toms River P. O., N. J.

Whatever Your Question;—be it the pronunciation of Bolsheviki, the spelling of a puzzling word, the location of Murman Coast, the meaning of blighty, ace, tank, ukulele, etc., this **Supreme Authority**—

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When the Tinker Came Along

THERE was a hole in your mother's dish-pan. How was it to be mended? One day Citizen Fix-it, carrying his battered fire-pot, with its bed of glowing coals, knocked at the back door.

You and your playmates watched him, fascinated, as he drew his iron hot from the coals and melted the end of his bar of solder. He rubbed the molten solder over the pan, and presto! the hole was gone.

Every day you live, solder figures in your life. When you turn a faucet, the water runs through pipes whose joints have been made water-tight with solder. The tins of fruit, meat, salmon, and vegetables opened in your kitchen are sealed with solder. So are the tubes in the radiator of your automobile. Solder closes the joints of tin roofs, gutters, and leaders.

Solder is a product of lead. Good solder is made of pure lead and pure tin, alloyed in the right proportions.

Countless other products of lead add to the comfort and convenience of your daily life—very often without your knowing it.

Consider your automobile, for instance. Besides the lead in the solder of the radiator, there is lead in the battery, in the bearings, in the glass of the headlight lenses, in the rubber of the tires, in the paint, and in the rubber mat on the step.

There are many other important uses of lead, in the arts and industries of civilization, and the most important of all is the use of white-lead as the principal factor in good paint.

The more white-lead any paint contains, the greater its protective power and its durability. Painters commonly use what they call "lead-and-oil" for all their outdoor work. This is simply pure white-lead, thinned by adding pure linseed oil. This paint is famous for its staying qualities and the long life it gives to the surfaces it covers.

The importance of paint-protection is just beginning to be generally understood. People are learning that a general heeding of the maxim, "Save the Surface and You Save All," will mean the conservation of millions of dollars yearly in property values. Unpainted or poorly painted surfaces decay—a surface painted with a good white-lead paint remains whole and sound.

National Lead Company makes white-lead of the highest quality, and sells it, mixed with pure linseed oil, under the name and trade-mark of

Dutch Boy White-Lead

Write our nearest branch office, Dept. F, for a free copy of our "Wonder Book of Lead," which interestingly describes the hundred-and-one ways in which lead enters into the daily life of every one.

NATIONAL LEAD COMPANY

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Dutch Boy White-Lead	Lead Pipe
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U. S. Cartridges and The Black Shells

XUM

This Summer in a LaFayette

Fortunate indeed is he, who, with a summer's day and a sunny road before him, can explore green country-sides in a LaFayette.

The great car moves along quietly and serenely as the placid rivers that wind across the journey.

It spirits its passengers across hills almost as effortlessly as it coasts them down the slopes.

It loafs between friendly hedgerows or travels more swiftly than any other car we know.

Between morning and the sundown it can pass an incredible number of milestones without bringing weariness to those who travel with it.

And with each mile it winds beneath its wheels, it brings to those it carries, new enthusiasm and new trust.

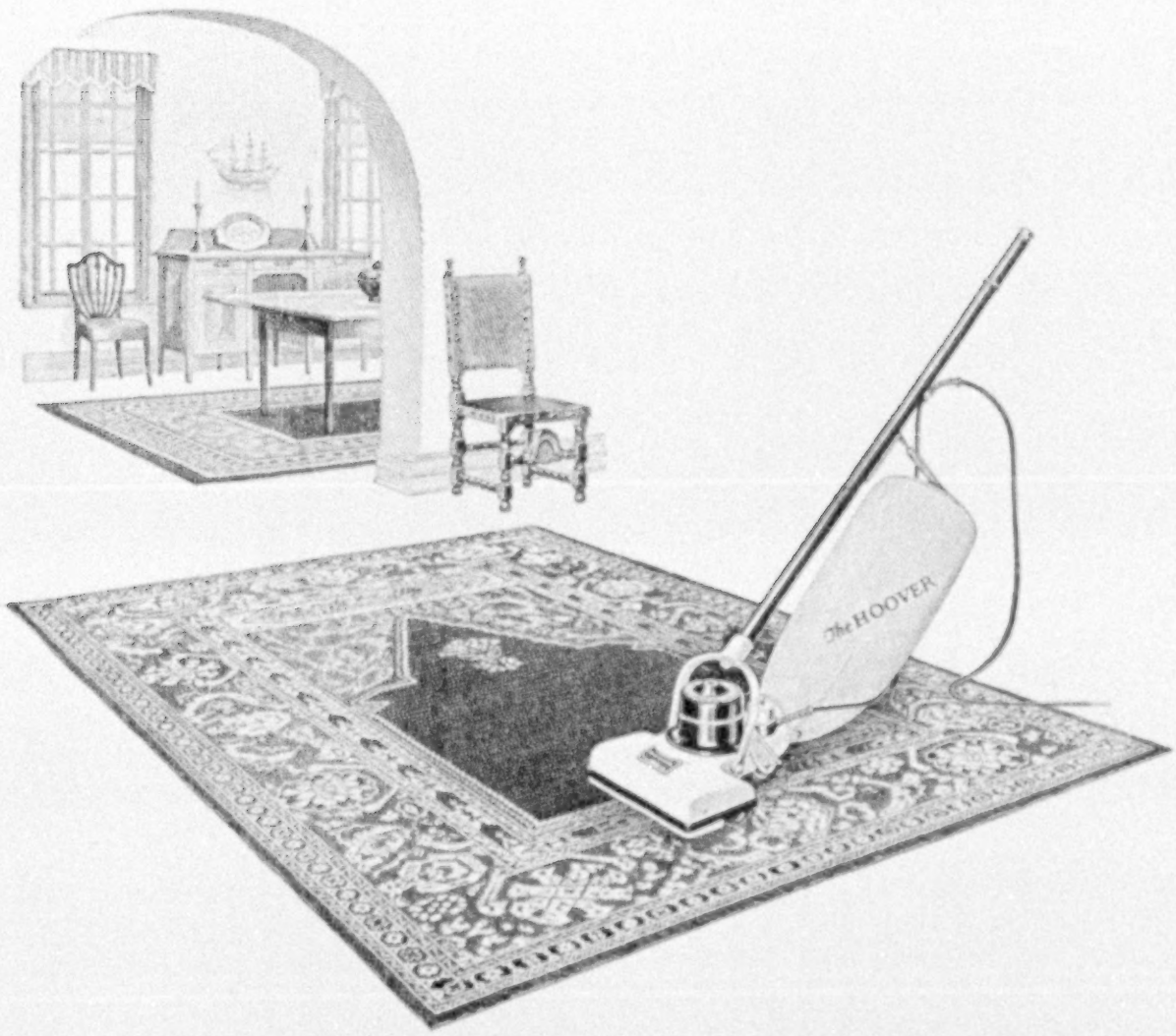
One thousand owners, many of whom have driven their cars 25,000 miles or more, declare there is but one car that can do these things in just this way.

One car and only one—

The hundred horsepower LaFayette.

LAFAYETTE MOTORS COMPANY at *Mars Hill* INDIANAPOLIS

LAFAYETTE



A Simple Test Will Convince You

Next cleaning day, after your rugs have been vigorously swept, telephone one of our Authorized Dealers to send out a representative with a Hoover—*no obligation, of course.*

Just let him glide The Hoover over your cleanest rugs, after first showing you that its bag contains no dirt.

You will be appalled at the dirt he will soon empty from the Hoover bag. You will be surprised that such apparently clean rugs could be so unsanitary.

Naturally such a condition is no reflection upon you. It is simply impossible to dislodge buried dirt from rugs except by beating, electric sweeping and air suction. The Hoover is therefore an absolute necessity.

Electrically it beats out all the nap-wearing disease-laden grit from rug depths; electrically it sweeps up the stubbornest litter, erects crushed nap, freshens colors and cleans by air—in one easy, rapid, dustless operation *guaranteed to add years to the life and beauty of all your rugs and thereby to repeatedly save its cost.*

Have a free home demonstration of this time-perfected cleaner and its attachments.

Phone any Tel-U-Where Information Bureau, any Hoover Branch Office, or write us for the names of Authorized Dealers.

Offered in three sizes, all moderately priced. Convenient terms if desired.

THE HOOVER SUCTION SWEEPER COMPANY
The oldest and largest makers of electric cleaners
Factories at North Canton, Ohio, and Hamilton, Canada

The HOOVER

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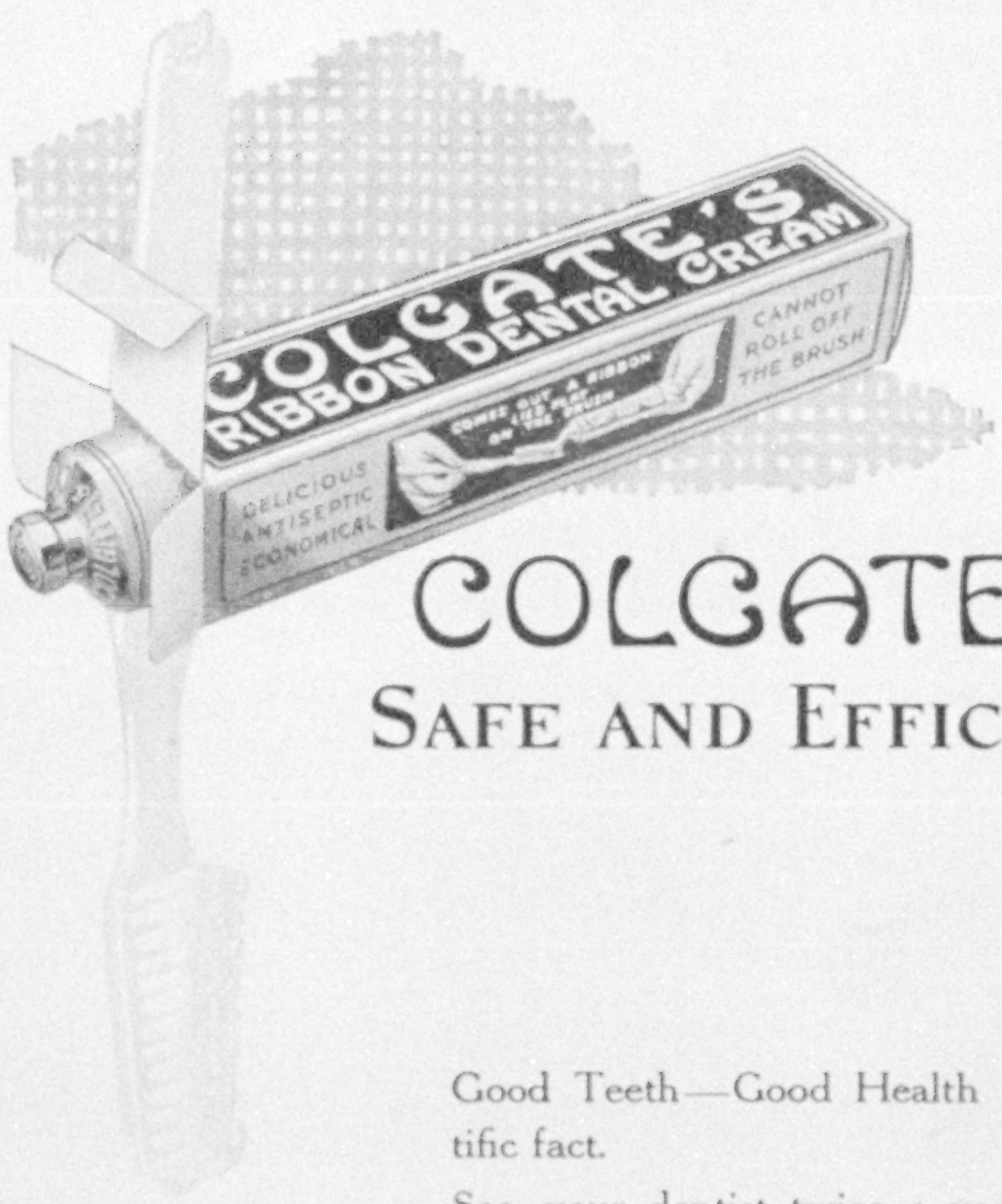

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Colgate's is safe and efficient—it does all that a dentifrice can! It brings to your mouth and teeth the help of reliable ingredients only, which do much good and avoid all possible harm.

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